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COOP'S TECHNOLOGY DIGEST

-A Timely Report On The *World* Of Communications-

Published as a confidential industry newsletter ten times per year by electronics and technology author *Robert B. Cooper*. All reports source checked for accuracy prior to publication; readers are cautioned to conduct their own verification of data prior to formulating business judgments based upon reports here. Data of unverified authenticity is nominally so-labeled as a guide to reader caution. The publisher draws upon 33 years of leading-edge electronic-industry media experience but can be mislead by those with clever agendas. Subscription and contact information appears at the bottom of this page.

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COOP'S TECHNOLOGY DIGEST

FEBRUARY 25, 1994 / Volume 94-02

1993: A Watershed For Technology?

The announcements arrived with annoying frequency - each new release seeming to warn us that some other 'old friend', such as PAL format television, was to be replaced with a new, unknown and little understood technology. In the case of television, compressed digital video widescreen TV would replace our trusted 40 year old PAL standard. In audio, something called Minidiscs were picked to bury CDs as well as other recently developed tape formats such as DCC. Even VHS videotape, the foundation of a vast hardware and movie distribution industrial complex, was headed for the rubbish heap. Two formats are vying for 'next world standard status', at the very least we will have digital VCRs. But possibly only for a few years as digital formatted CDs make a run at the technology prize. Even radio broadcasting came under threat during 1993; 'digital radio' was approved in the UK, a new frequency band established for it to develop, and a schedule announced for the replacement of FM (band III) radio with the new CD-through-the-air technology.

It was the speed of technological change which irritated most. Consumer video recording illustrates. Early in 1993 it became apparent all analogue methods of distributing, recording, archiving and broadcasting television were on a short string; digital would replace analogue. With the adoption of the first truly 'world standard' for television (MPEG-2, a digital format) and the phased-out end for PAL, NTSC, SECAM and the variations of each, digital VCRs were a given. Ten of the largest analogue VCR manufacturers agreed to form a 'conference' to work out the fine points of a new digital VCR world standard. Within 30 days there were two separate announcements strongly suggesting digital videotape might be only an interim technology. Sony and Korean Samsung separately displayed working digital video CD recorders using variations of the MPEG format. Both pointed out the obvious; no matter how small a tape cartridge, it could not compete in efficiency nor cost against a 5" (or even smaller) CD that could hold several hours of recorded video. And both demonstrated technology that would allow consumer camcorders to record at will on video CD ending forever the major distinction between tape and CDs: you could record or playback on tape, you could only playback on CD.

Complicating the barrage of announcements signaling major changes in every area of consumer and industrial electronics were those parallel announcements assuring us that several previously stand-alone technologies were converging. Telephone lines were upgrading to carry video, cable lines were expanding to carry telephone, FAX and data, and computers were adapting to interface

with either, or both. An old term was given new meaning: 'interactive' came in 1993 to mean that users of remote, central data storage facilities would have new real-time freedom to manage or manipulate or transfer these vast data banks at speeds of a half megabyte per second. And even faster speeds were promised within five years. How fast is 1/2 megabyte per second? A reasonably state of the art 200 megabyte capable home PC could go from an empty hard disc to a full drive in 6 minutes and 40 seconds through a fibre or cable TV link. Tomorrow's technology? No, that was the frightening part. It actually happened yesterday. We may not have it here, in New Zealand yet, but it was on the way.

That was another frightening aspect of 1993. Nobody expects New Zealand to have exciting, leading edge, technology first. In the past we were able to drag our feet more than 15 years after full broadcast TV arrived in America, for example. When New Zealand television did startup (1960) home industry produced virtually all of the TV sets sold for the first 10 to 15 years. Only when colour arrived (1973) did New Zealand industry give up on TV set production. That was yesterday. Today, New Zealand depends upon world market sources for not only our TV sets, but our stereo sets, our PCs, our camcorders and our CD players. If the rest of the world adopts new technology, replacing PAL analogue TV, replacing CDs with minidiscs, replacing VHS VCRs with something digital ... we have no real choice in adapting ourselves. As we shall see in this report, each of the new technology innovations is on a time schedule about which New Zealand has no input. We can adapt or we can freeze in time. There are no other choices.

1993: Japan's Chickens Come Home To Roost

New Zealand dependence upon Japanese sources for a high percentage of our consumer electronics hardware is legendary. In this report we visit the 'import sources' and review how our import dollars are being spent in the electronics field. For more than ten years Japan has been a 'comfortable' trading partner. We buy their electronics; they send us their tourists.

Japan entered an economic recession in 1990. Few, even in Japan, understood it at the time. By 1993 the three-years-in-a-row official numbers were frightening; to the Japanese, and to those Kiwis who deal with Japanese trading companies for their consumer electronic products. The nature of the Japanese electronic industry has changed dramatically since 1990 and we look at that change here. One fact alone says more about this change than all of the tables, graphs and summaries could ever explain. In 1994, Japan will for the first time in its history import more television receivers than it will export. 'Japanese consumers buying foreign-built TV sets???' The Japanese electronic revolution may not be over; but it is significantly altered in course.

No question, 1993 was a year of decisive change. The centre of technological change has shifted away from Japan and its minions to widely scattered points on the globe. At the heart of the 'digital revolution' is a resurgence of American technology and in virtually every field (consumer electronics, computers and telecommunications) the changes sweeping America are penetrating outward around the globe with a speed never before possible. At the heart of this change is the ability for technology information to circle the earth via satellites and fibre optic links at the speed of light. Technological progress measured in months a decade ago is now measured in days. Few seriously doubt it will be measured in hours by the turn of the century. And New Zealand, via our satellite and fibre optic linking to the world, is no more remote from these changes than Tokyo or Los Angeles. Perhaps that, more than any other factor, is the most difficult change to accept. For the first time in New Zealand history we are in the centre of the action and we cannot duck it, we cannot ignore it.

1994: Coming Up To Speed

There is a saying about revolutions: Join it, get out of the way, or be run over by it.

Located at the antipodes from London, New Zealand managed to 'get out of the way' for most of the 20th century. When it was convenient to do so. Television is a case in point; it was convenient to stay out of TV for some 25 years after the BBC established the first transmitter at Alexandra Palace. FM radio is another case in point; more than 40 years passed between its commercial start in the US and its start here. But New Zealand adapts quickly, once offered a new technology. We are told by the Statistics New Zealand that percentage wise, more Kiwi homes have VCRs than say America, or the UK. Cellular telephones are another, more recent, example; Kiwi users by percentage rank in the top-5 of all nations of the world.

But this digital change is unlike any we have previously seen. These are not simply new products; digital represents a wholesale replacement of virtually every consumer entertainment electronics device in the home. A not insignificant annual turnover is represented by the annual importation of VCRs, TV sets, camcorders and audio equipment. That New Zealand number, at the import level, came to $222,272,695 in 1993. All of this is at risk over the next few years. Also at risk is the radio and television industry advertising turnover; $562,000,000 in 1993.

MPEG-2

At the root of the change from analogue (PAL) format television to digital television is the new 'worldwide digital TV standard.' What makes a standard?

Basically, uniform agreement by all potential users and regulators. In the past the adoption of standards was an exercise in bureaucratic red tape. Regulatory agencies (such as our Ministry of Commerce) were under no pressure to take a lead in pushing a standard and if it took five, even ten years to see through from concept to acceptance, it was not a worry. Not this time.

Today, the speed of technological progress insists that new standards be (a) rapidly adopted, and, (b) rapidly implemented. Waiting five years is the best way to kill a promising new technology because in five years time it is certain the new technology will have been superseded by something faster, cheaper, better. Japanese HDTV is a case in point. It first surfaced in 1972, was mature in its analogue form by 1976. The Japanese tried very hard to get it adopted by others, and finally created their own (limited) national market for analogue HDTV. They even created special satellite channels to distribute this format. The concept of HDTV was appealing, the technology spot on; but nobody but the Japanese wanted it at the time. It was neither rapidly adopted nor rapidly implemented. As a business venture, it failed.

MPEG is named after the 'standards group' that pushed the new digital TV standard to world acceptance. The Motion Picture Experts Group became an ad-hoc sounding board for a new digital technology that did one important thing the Japanese HDTV did not; where Japan's HDTV required more spectrum than standard TV, MPEG HDTV requires less. With MPEG it was possible to have more 'programme channels' per increment of bandwidth and this feature alone appealed to an industrialized world that had exhausted most of its available spectrum resources. With MPEG, HDTV would fit into a limited spectrum resource. With Japan's analogue HDTV, it did not.

MPEG STATUS TODAY:

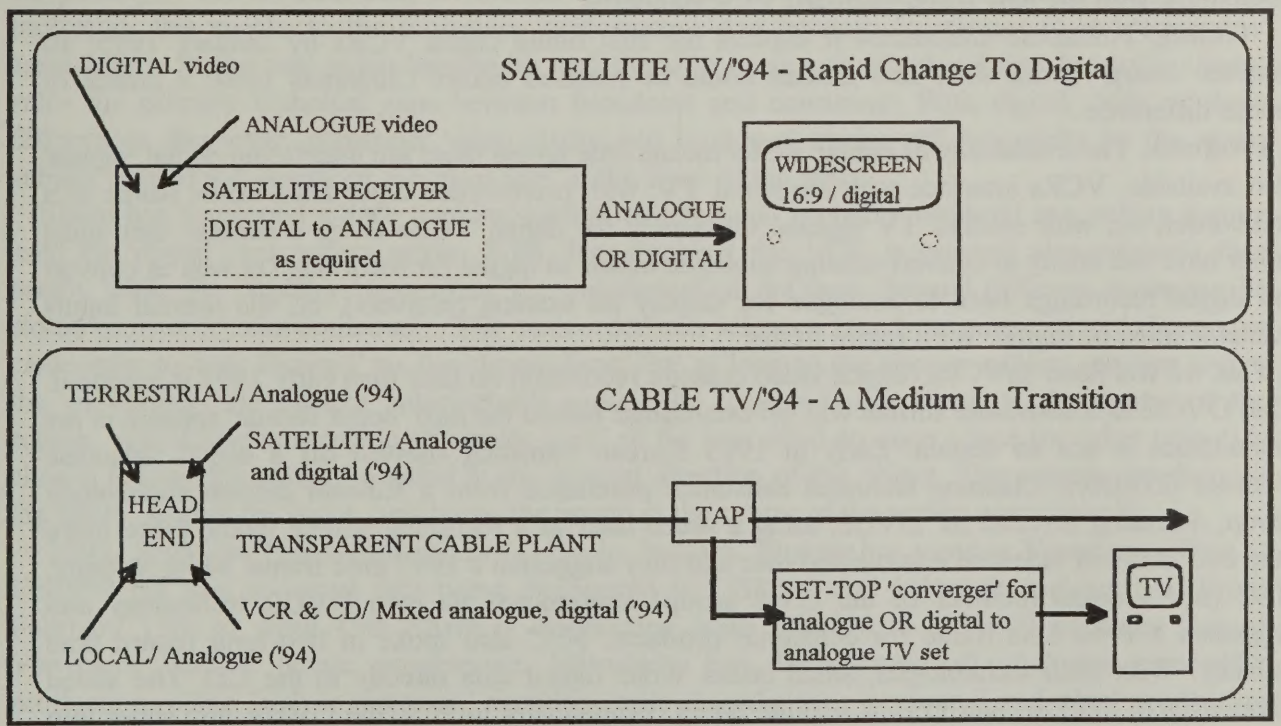
There are no serious roadblocks standing in the way of MPEG-2 compressed digital video becoming a 'formal' world standard before the end of this year, early in 1995. Most of the world

was awaiting a US decision which came in November. What remains is world-class bureaucracy, primarily the International Standards Organization.

Once you accept MPEG-2 as a video standard, new questions arise. How will you transmit this new format, i.e., what will the transmission standard be? The transmission standard is separate from the basic video standard. You can build camcorders, VCRs, CD-I players and studio production equipment knowing only the video standard. You cannot build TV transmitters nor TV receivers until you have transmission standards. The American digital transmission standard for terrestrial (broadcast TV) was scheduled for final selection before March 1st. Tentative selections are in place in the UK, and Japan. Once again, much of the world awaits the American decision.

Satellite and cable do not require waiting for terrestrial transmission standards although strong arguments could be made for waiting in both areas. Satellite, in particular, is free to adopt its own variation of MPEG-2 if it so chooses since the individual satellite receivers position ahead of the TV receiver itself, and any 'standards adjustment' required can be done in the satellite receiver unit. For most modern cable systems the situation is similar; all terrestrial, satellite and other programming sources pass through the cable operators 'headend' facility. Within the headend the cable operator has the ability to reconfigure, adjust, convert any incoming signals he receives to a 'cable standard' for cable carriage. Once on the cable, the signals then pass through a set-top 'converger' in the viewer's home which processes the digital cable signals back to a format the cable customer's TV set will recognize. All of this is shown here in graphic form.

The speed at which these changes take place will determine the impact on the New Zealand marketplace. In the best case, there is a decade or more of 'transition' from analogue to digital; in the worst case, the changes take place much more quickly leaving businesses with substantial resources invested in analogue out in the cold. In some areas, such as terrestrial broadcasting, regulators and policy makers can drag their feet to slow down a technology. In other areas outside of the regulatory footprint, and this would include international satellite service, video tape based systems and the new CD video, a slow uptake by regulators could work to the detriment of established terrestrial broadcasters. At this point in time the New Zealand $423,000,000 (1993



number) television advertising industry is at some risk if there is not a well executed plan to bring New Zealand onto the digital television playing field of the 21st century.

In the balance of this report we look at the 'status' of the many technologies as we enter 1994.

DIGITAL VCRs AND DVRs

All forms of television (broadcasting, recorded materials) are driven by the availability of software (programming). The same basic truth also drives the videogame world; an advanced game 'system' is only as successful as the software available to support it. The consumers have no real interest in the technological achievements of a system; only the entertainment value they receive. Sony's Betamax VCR system failed in the marketplace not because of its technological inferiority to VHS but rather because Sony was unable to attract sufficient co-builders of the hardware to in turn attract the software providers. VHS was never a superior system to Beta; it was merely a system that was promoted better. S-VHS is superior in technology and results to both VHS and Beta but its success in the marketplace was minuscule (less than 0.9% of VHS) when compared to both. Technology does not sell products; software sells products.

To attract software to CDVT (compressed digital videotape) ten major suppliers of home VCRs have formed the Digital VCR Conference (calling themselves DVC). Philips and Thomson plus 8 Japanese firms (Hitachi, JVC, Matsushita, Mitsubishi, Sanyo, Sharp, Sony, and Toshiba) make up DVC. IBM and Apple recently requested permission to join the group. DVC has accepted the MPEG-2 standard for digital VCRs and established that 1/4" / 6.5mm 'evaported-metal-tape' will be the recording medium. Two sizes will initially be available: a 30 minute tiny (DAT audio sized) tape and a larger 4.5 hour tape. Both 'lengths' relate to standard definition television. In the HDTV (high definition) mode the tape runs at twice the speed making maximum recording time 15 minutes and 2.25 hours. Regular DVC meetings have been held to work out the finer points of the new 'world standard' system and the next such meeting is in Tokyo in April. IBM and Apple have requested membership primarily because they want to be certain their next generation PCs are compatible with the new world-standard VCR standards.

Timing. Panasonic announced it expects the first home digital VCRs by January 1995; 10 months. Sharp reports their first models could be released before Christmas 1994; a matter of weeks difference.

Products. The availability of digital VCRs means little unless there are interfacing digital 'signals' also available. VCRs interface with terrestrial TV, with prerecorded tapes from rental stores or a camcorder, or, with satellite TV signals. Obviously for digital VCRs to be a success they must either have the ability to convert existing analogue inputs to digital for recording (as well as convert the digital recordings back to analogue for display on existing receivers), or, the normal inputs available must be digital. We'll return to this.

That we will have DVCRs (digital video cassette recorders) no later than early 1995 is accepted. That DVCR as a consumer format will get established before the next 'better format' appears in the marketplace is not so certain. Early in 1993 Korean Samsung showed off a digital videodisc recorder (DVDR). Claiming technical assistance purchased from a Russian defense technology group, Samsung forecast its' DVDR using a green laser as a recording source would place more than two hours of video on a two-sided disc and they suggested a 1995 time frame. More recently, NEC (not a direct member of the DVC group) announced its own DVDR technology and suggested a 1996 time frame for consumer products. NEC also spoke of two hour record time capacity. With both technologies, small lasers 'write' digital data directly to the CD. The stated advantages of DVDR over DVCR include direct compatibility to PCs (the DVDR disc slides into

any PC equipped for MPEG-2 video), lower mass production costs for both the recorders and the recordings, greater permanence than videotape, lass space consuming storage and with disc changers the ability to store and select at will from several hundred discs all automatically.

This suggests to many that DVCR will be an 'interim' technology to be replaced with DVDR. Few argue with that forecast but firms such as Sony believe the technology required for trouble-free DVDR will not be available much before 1998. DVCRs, on the other hand, will be available in 1995. Both formats are based upon MPEG-2 so the question relates to the storage medium, not the recording standard. For a more detailed discussion of DVDR see the summary to follow.

1994. Few if any innovative analogue VCRs are anticipated in the marketplace. Many firms, such as Sharp, admit they are withholding additional analogue features to be released with the new digital models. Analogue VCR pricing is already headed down to 'clearance sale' pricing. Two head Toshiba's now carry a suggested retail of NZ$360. Sony dropped hi-fi VCR prices 5% January 1st and the list goes on from there.

CAMCORDERS

It is entirely possible the first digital video products available will be consumer camcorders rather than digital VCRs. In the analogue past, new analogue improvements have appeared first in the high end broadcast quality camcorders, and then eventually trickled down to the consumer products. A technique such as 'steady cam' (electronically eliminating the jitters on a picture caused by an unsteady hand) is such an example. Sharp and Panasonic believe that with digital technology improvements will appear almost simultaneously in both broadcast and consumer product streams. Panasonic in January invited potential buyers and journalists to witness a demonstration of their D5 format broadcast digital VCR based package. D5 is a high end broadcast adaptation of the basic MPEG-2 format. The NZ$108,000 price tag won't attract many consumers but Panasonic used the demonstration to suggest that 'low end' digital camcorders "*costing around 1/100th of the D5 package*" will be essentially a 'throwaway, expendable news tools for broadcasters' by 1995. Indirectly, this speaks to the narrowing performance gap between 'professional' and 'consumer' camcorders. In the past video bandwidth and signal to noise ratio (both relating to image clarity) were the primary technical gaps between broadcast and consumer. With digital, both of these differences disappear; consumer video clarity and broadcast clarity will essentially be the same, subject only to the quality of the 'glass lens' at the front of the unit.

Sharp has developed a 'face tracking' system which it will probably withhold as a selling feature until the digital camcorders arrive. With 'face-tracking' the VCR is pointed at a subject's face briefly while the circuitry 'memorizes' the uniqueness of the face. Several different faces can be stored in memory simultaneously. The camcorder user selects a face from memory and directs the camcorder to 'stay focused' on the chosen face. For as long as the chosen subject remains within the viewfinder, the camera automatically moves the chosen image (face) to the centre of the screen. This is one-upmanship of 'steady-cam;' all the user need do once a face (or other object) is chosen is keep the camera pointed in the general direction of the object. The camera steadies out the jitters, adjusts the focus, and keeps the image in the centre of the screen automatically.

1994. Sony cut Handycam prices 6-11% in January. Sharp's hot moving Viewcam selling at US$999 list was in actual fact being discounted to US$800 and below in major cities. From February 15th to April 15th Sharp is discounting from US$100 to US$200 its entire line of Viewcams with a rebate programme. Mitsubishi has discontinued all analogue camcorder production, citing 'high inventories,' simultaneously reconfiguring personnel and plant production

facilities to the introduction of digital camcorders. More than 90% of all (analogue) camcorders originate in Japan; they could be in short supply by Christmas.

DISPLAYS

Cathode Ray Tubes (CRTs) face double jeopardy. Prices worldwide have gone up 6-8% this year as virtually every CRT plant operating is at capacity. New display plants are being built or planned but ...

1) Many will build LCD displays rather than CRTs, and,

2) If they do build CRTs, the new widescreen (16:9) picture tubes become a consideration. Plants can build both 4:3 and 16:9 of course, but not at the same time in the same facilities. No major new CRT plants are due on line in the world before 1996 and Sony's schedule to double current production levels in the USA in two years is typical. New plants planned are being built for reasons of moving the display portion of TVs and computers closer to the market than for reasons of increased CRT capacity.

Display technology is rapidly changing. Matsushita's 14"/75mm beam matrix flat display screens, while only available in small numbers now (under 3,000 per month), challenges conventional CRTs. They expect prices to drop to CRT range prices for the same size displays by 1997. They also expect flat display screens to 25"/635mm by 1996; to 40"/1016mm by 1998. The primary advantage is screen depth (3.9"/74mm at present) for 'hang it on the wall' displays.

LCD technology matured rapidly during 1993. Motorola's In Focus Systems and Sanyo have cured the high costs associated with active matrix LCD systems and greatly expanded the quality of LCD especially in well lit rooms and at side viewing angles. They expect mass production of their 'active addressing LCDs' by mid 1995.

Sharp, with 43% of the world's LCD business at present, has TFT - wide angle viewing, high resolution improvements in the works and with plant expansions will build new 10,14 and 17 inch panels starting in July 1995. Their present 8.4 to 10" display production is under expansion to a goal of 350,000 per month by the end of 1995.

Although direct view (CRT display) sets are now available to 35" in size, new technology for projection sets strongly suggests CRTs past 32/33" in size may disappear shortly after widescreen 16:9 digital-driven displays come on line. Hitachi begins shipping a 16:9 widescreen projection TV with a 40"/1016mm screen in June priced at NZ$6600. What is especially interesting about this set is that despite its sizable screen, the set is only 399mm deep; about the same as a standard 13"/330mm TV. A 1016mm screen TV that requires only 400mm of wall-depth space is a significant advance in technology.

1993 saw consumers worldwide selecting larger screen sizes; the 'average' screen size sold (discounting all sets below 15" as portables) went up 1.9"/48mm during the year, the largest one year jump in history. CRT-brightness level, 'depixilized' portable projection units capable of 60"/1524mm displays at prices as low as NZ$1800 are scheduled for August-September shipment.

1994. We are nearing the end of the CRT era, pushed in smaller screen sizes by LCDs and in the larger sizes by projection units. It is happenstance that this is occurring at the same time as analogue disappears in favour of digital, but by 2000 replacement CRTs will be difficult to find and expensive. New Zealand firms that rebuild CRTs in 2004 should do well simply because NOS (new, original stock) replacements will no longer exist.

THE TV RECEIVER

Perhaps the most important, and presently unanswerable, question of all is "*When will analogue TV sets no longer be built?*" The answer is far more complicated than "*When analogue TV is no longer transmitted.*"

Conversion of all TV delivery mediums (including terrestrial, satellite, VCRs and CD video) to digital will be gradual; if you call 10 to 15 years gradual. To encourage the conversion, and to accommodate the transition, leading technology countries are setting dates when all analogue over-the-air transmissions will cease. Most such dates announced are in the 2008-2010 region (USA, Japan, UK). Starting this year (USA, UK) regular terrestrial digital services begin in parallel to existing analogue services. By 1996, as many as 10% of all then-existing TV transmitters will be paralleled by digital; by 2000, more than 50% is forecast for most of North America and Europe. New Zealand has not made such a commitment, yet (CTD: Aug. 1993, Jan. 1994).

Inaugurating digital transmissions will cost broadcasters very sizable dollars. Regulatory agencies are still grappling with how to provide incentives for non-government funded terrestrial telecasters to make this expenditure. The most appealing incentive is to allow broadcasters to convert their existing analogue 'channel space' to multiple programme channels of digital service (CTD:Jan. 1994, p.2). Costs run through the entire broadcasting plant, from the smallest video processing unit through camera chains, production and editing studios, and microwave links, to the actual transmitters and antennas. It is 'starting all over again' and most broadcasters will need several years, as much as a decade, to make the conversion out of cash-flow. In some areas, such as cameras and tape decks and editing suits, the conversion is already underway; just as shortly consumers will find analogue camcorders difficult to find, broadcasters are already faced with fewer and fewer analogue buying options each year. Normal upgrading of such equipment would replace much of it ... up to the microwave, transmitter and antenna portions of the chain within 15 years anyhow. The problem broadcasters face is that for a period of time they must operate twin plants, one analogue and one digital, to accommodate the replacement of analogue receivers by viewers. This will dig heavily into telecaster profits until perhaps 2010; broadcasting stocks may not be a growth area again until 2005 or after.

Which comes first; the telecaster or the TV receivers? Until telecasters begin digital transmissions, digital inroads in consumer TV set sales could be minimal. VCR conversion to D-VCR will speed up the process; in Europe and North America direct to home satellites using digital transmission will also be a factor. Digitized prerecorded video, consumer camcorders producing recordings in 16:9 format will boost digital-based consumer TV set sales. Wide-screen format movies and sporting events available via digital satellite to the home will also help. But until the local terrestrial telecaster 'goes digital' consumers will be mostly disinterested in the new

MPEG-2 TERRESTRIAL TV SCHEDULING

MARCH 1994/ Selection of US terrestrial over-the-air system.
NOVEMBER 1994/ Parallel 'simulcasting' in digital and analogue formats begins in USA.
JULY 1996/Digital HDTV coverage of some 1996 Atlanta Olympic events; 10% of US network stations forecast to be digital-transmitter equipped. HDTV signals distributed worldwide via satellite to those fortunate enough to have both satellite receivers and digital HDTV receivers.
JANUARY 1997/ Wide scale marketing of digital-only and digital-analogue hybrid sets begins in USA, Europe, Japan.
2000/ Virtually all Sydney Olympic events delivered via digital HDTV to worldwide audiences via satellite; more than 50% of US homes forecast to be equipped with digital or digital converger receivers.

technology. Software drives technology, and with more than 1,000,000,000 analogue TV sets in use in the world, a great deal of software will be required..

Singular events such as the Olympics are a focal point for the new widescreen, digital technology to showcase. The 1996 Atlanta Olympics will see limited use of widescreen; the real 'widescreen Olympics' will be in Sydney in 2000. Major programming and telecasting organizations are focusing on the time frame surrounding Sydney for the real earth-circling expansion of digital widescreen technology.

Digital transmissions will be received on analogue sets, but only through a 'converger' box. More than 1,000,000 cable TV digital to analogue 'convergers' will be delivered to USA cable systems in 1994. The first dual-format TV receivers, capable of digital or analogue reception, are not likely before mid to late 1995. Widespread marketing of these interim-dual-format receivers is unlikely before February-March of 1996 and the market for the first units will be folks with early model D-VCRs, satellite receivers and those located where digital transmissions from terrestrial broadcasters will be available during the Atlanta Olympics.

1996 dual-format receivers will offer 4:3 analogue display and 16:9 digital display. Whether the actual displays will be CRTs or some LCD/flat screen format will be a manufacturer decision; chances are most of the first units will be CRT rather than solid state displays but solid state displays will ultimately win.

Converger boxes will offer some of the advantages of digital, but not all. The superior sensitivity of digital systems, digital 'tricks' such as viewing two or more TV programmes simultaneously will be included. Not included will be widescreen (except in letterbox pseudo-widescreen) or high definition displays. Converger boxes will allow consumers to gradually 'slide into' digital, give them access to programming available only in digital (such as satellite and camcorder video shot in digital), but the converger box will disappear when the last analogue TVs disappear.

Cable TV set-top convergers are selling to large US cable operators for NZ$380 a pop. By the time convergers get into consumer hands through a local stockist, expect pricing nearer NZ$850. The consumer will face a decision; spend $850 for a converger so as to enjoy some of the features of digital on a 4:3 screen, or, spend somewhat more money for a fully digital capable widescreen TV set. The converger boxes will be available before the fully digital TV sets; there will be a small market for them in New Zealand until terrestrial broadcasters begin parallel digital telecasting. Analogue to digital convergers will be an interim, transition technology at best.

So too will be dual-purpose analogue plus digital TV receivers. Leading TV receiver manufacturers have pooled their efforts to create a committee to oversee the transition. As one example of how normally competitive firms are cooperating, Philips, Japan's Alps and Matsushita are jointly working out technical and mechanical details for the lowly 'TV tuner;' the channel - frequency selector. In digital TV, one 'analogue channel' becomes 2 or 4 or even 20 separate 'programming channels.' The new tuners have to handle these mini-channel selections. The standard being worked out will harmonize all tuner electrical connections and mechanical sizings between manufacturers; i.e., 'any tuner to any set at any time.'

1994. But before we arrive in the digital world, we have interim transitory technology. Five major brand names already have 16:9 analogue widescreen sets on the market (JVC, Panasonic, Philips, Toshiba and Thomson/RCA). Screen sizes run from 30"/762mm to 56"/1422mm. Prices range from NZ$6300 to $10,800. In 1993, total worldwide widescreen sales numbered fewer than 20,000 units; no more than 40,000 are forecast for 1994. Sharp will bring a 30W and 34W pair of receivers (CTD: 9401,p.37) to market during July-August, citing the number of Laserdisc 16:9 film titles now available (700 plus), and, the introduction of digital widescreen satellite TV in the

US (this April) which will selectively use many of these 16:9 film offerings. Quasi-widescreen is a 'cute trick' that will muddy the consumer understanding of widescreen initially; JVC and Korea's Goldstar have demonstrated an electronic picture stretching system that expands 4:3 standard view images into 16:9 by gradually stretching image pixels towards the sides of the display.

'Real' widescreen receivers are unlikely before real dual-purpose analogue plus digital receivers appear; late 1995 to 1996. Anything purchased in the interim that lacks the ability to process a digital input signal is a pseudo (16:9) widescreen and likely to be an early candidate for a museum.

VIDEO CD

Any firm that has capital invested in VCR manufacturing also has research money involved in video CD. Japan as a source for VCRs has steadily declined during the past three years; US importing of Japanese VCRs dropped to 30.7% of all VCRs sold in 1993 from more than 50% in 1990. In New Zealand, Japan accounted for 55.83% of our VCR imports in 1993.

Korea would like to be considered a technology challenger of Japan. Korea's Samsung has invested serious R and D money into the refinement of Video CD. So too has Philips, and Sony, and ... the list is quite long.

The software owners and distributors, the movie people who provide the product for video rental stores, would very much like to see the refinement of video CD. When perfected, it will be cheaper and better than videotape. But it also must be 'better,' as articulated by Sony America President and CEO Michael Schulhof:

"Each new development in packaged media has to offer an improvement in picture quality. One of the biggest problems with (present day) video CD is the picture quality is a step backwards from VHS. The second problem is the packaged video has to encompass a full movie on a single playing side. That means 135 minutes per side - which is the minimum playing time per side to be considered acceptable."

Present day video CD is best known by the Philips CD-I package. And it has an 'image' problem. Philips created CD-I not as a movie screening medium but rather as an interactive game and creativity medium. Movies play with the CD-I when you add an adapter (FMV Cartridge). Unfortunately, the first FMV/CD-I packages used an early MPEG format. That format (MPEG-1) produces video that is lower in grade than VHS tape; far less than Laserdisc. And in the best case the maximum recording time per CD side is around 74 minutes; more than one hour shy of the 135 minutes considered minimum before video CD can challenge videotape as a distribution medium.

Philips agrees with the assessment; recently a spokesman noted:

"What is needed is a high density CD medium with a quality at least equal to Laserdisc. Philips wants a mature technology capable of surviving in the consumer marketplace for at least ten years. We hope for this level of competency by the end of 1994."

But today, in February 1994, video CD is not ready to challenge the next generation of (digital) videotape. Nobody doubts it will come; least of all Sony. They announced several improvements in CD recording technology in 1993, but pointed out that, in their view, it will be 1998 before the refinements are 'consumer-ready.' Samsung, as noted, believes it will happen as early as 1995 but readers are cautioned to recognize the intensive level of competition between Japan's established electronic companies and Korea's up and coming electronic companies. In the heat of this competition, Korea could be excused for trying to upstage its Japanese counterparts.

1994. Anything that says 'Video CD' on the carton is in fact a low-grade VHS quality playback system. In some industrial applications, that's good enough. Firms with consumer video CD

products (stand alone players or combination boxes that play games plus add video CD playing capability) include Philips. Others with video CD capability will by the end of 1994 include Samsung, Technics (a Panasonic company), Goldstar and Yashica. Sony could introduce a video CD player mid-year. In the software area, which will sink or float the current interest in video CD, Paramount promised to release 50 films on the format in October. Fifteen have actually appeared to date. More recently, MGM/UA agreed to release 30 films in the format. Most 'motion picture banks', however, are waiting for the technology to mature. This one bears watching, but until video CD satisfies the movie distributors requirement of a single film on a single side, don't look for much to happen here.

ODD MAN OUT

S-VHS, the technically superior recording system now nearly a decade old, amounted to 0.9% of all VHS imports into the US during 1993. Statistics New Zealand does not keep track of 'formats' so no similar comparison can be made. S-VHS is an example of a 'better technology' that never made consumer big time.

It was inevitable that when digital overpowered the electronics world in 1993 some R and D then underway in the analogue field would be squashed. W-VHS is one. JVC had spent more than five years creating this brand new, unique to JVC, analogue format that is said to be 'the equivalent of digital.' W-VHS is backwards compatible to S-VHS, uses a special tape format unlike any other, and is capable of creating analogue recording of high definition TV. W-VHS was not scheduled for introduction until mid-94, but was rushed to announcement last November out of fear it would be totally lost. It is a consumer oriented format, and Hitachi recently announced they will also 'support' the format. W-VHS is presently only available in NTSC on special order at NZ$10,250 per VCR. One year ago that would have been heralded as a technology / price breakthrough. Today it doesn't even cause a ripple of interest.

The Philips promoted Video CD format is a 'sitting duck' for many 'improved formats' each built around the desire to somehow reach the magic 135 minutes per side requirement of the movie folks, or simply to create a format unique to a particular product brand in hopes that this will control software marketing as well. Karaoke products (video CD with sing-along) are a case in point and at the moment the hottest CD video market going. An example of a unique format within the general video CD field is the Pioneer Alpha Vision system available in March. The 5" CD 'spins' at three-times the speed of a normal video CD allowing a faster transfer of data. More data equals better resolution, greater interactive capabilities. It also shortens the maximum use time per CD side. So many 'technical games' can be played with video CD specs that there may be a dozen or more totally different, largely incompatible formats before one single format conquers all. And that is the primary concern of Philips when it pleads with the industry to 'come together to create a single format that has a chance of becoming a world standard.' For now, the splinter formats beat each other to death in the marketplace, the software people avoid them all, and the marketplace goes by default to the videotape camp.

LASERDISC

For sheer consumer movie quality, nothing available to consumers to date has come close to the Laserdisc. Initially backed by big brand names (RCA et al), the Laserdisc was supposed to give the VHS tape movie business some competition. It never did, RCA and others left the field, leaving Pioneer and a handful of smaller firms laboring to keep the format alive. Laserdisc is an analogue

format; that's the bad news. The good news is that Laserdisc has managed to run up nearly 1,000 available movie titles on 'disc' and in 1993 210,757 players were imported to the US. (Once again, New Zealand keeps no specific records of Laserdisc players imported but it is unlikely to exceed a few thousand units per year.) Today, just over 1.1% of American homes are believed to own a Laserdisc format player. After nearly ten years in the marketplace, that's not very impressive. Nor are the prices. From US records, the average Laserdisc player has a 'factory price' of US$412 while the average VCR imported has a US$229 (1993) 'factory price.' How could a playback-only system that costs 180% of a record and playback system survive?

Quality of product is one answer. Laserdisc offers image quality that VHS cannot match. Not as good as digital will be, perhaps, but far better than VHS. Laserdisc also offers widescreen displays (although considering how few widescreen TVs were sold in the US in 1993 - under 20,000 - this would not seem to yet be an important factor), superb still-frame display, and indexing to any frame on the disc.

Pay television is another more important answer. Hotels and motels offering 'Movies On Demand' to tenants almost universally now use Laserdisc players. So too does the cable TV industry in America for its Movies On Near Demand. Thousands of Laserdisc players each month are sold into these semi-industrial user applications.

1994. The short term prospect for Laserdisc players is good. Dolby five channel (AC-3 standard) theatre surround sound is to be added to the format late this year but once added only newly released discs mastered from 5 channel sound theatre movies will have it. Because of the heavy investment by users 'selling movie viewing' to consumers, Laserdiscs could well survive several years into the landing of digital VCRs; probably until DVDRs are finally here and the software is available to back up digital video on a disc. Only when you can do on DVDR what you can now do with Laserdisc, and there is a software library to back up DVDR, will Laserdiscs go away.

GAMES

Videogames are driven by one creed: speed. The faster a game's electronics can compute moves and display results, the better the game players like it. Game speed is measured by many factors, but usually described by the bit rate of the in-built processing systems.

High-quality games rely upon software programmes typically sold on CD-ROM discs. The CDs are formatted for a particular game format; games on a CD that work in a Sega game player will not work in a Nintendo. Game manufacturers therefore are more like the original Kodak company (build cheap cameras, sell lots of moderately price films) than like TV or car manufacturers who have to make their profit in a one-time sale of an expensive piece of machinery.

More and more processing speed is being built into game consoles. The faster the processing, the more complex and high speed the CD-ROM games. Game systems are limited today by console processing speed, not CD-ROM data capacity. But a crossover is approaching when as console processing speed increases, CD-ROM data access speeds and data capacity will be the limiting factor in further speed enhancements.

'Bit speed' in games is shorthand for system attraction or 'action'. More bits equals not only faster processing speeds but it also equals greatly improved display graphics. The stick and box-like on-screen figures of five years ago are now replaced by near-life-like computer generated humanoid or nature-like displayed characters. The Jurassic Park dinosaurs are a perfect example of the realism now possible with computer generated objects.

The game industry predicts 1994 sales of 16-bit hardware (i.e., consoles) to be 'flat' with 1993. That means no real increase in units delivered. Nintendo delivered 6.8 million units, Sega 6 million in 1993. If the reality of those numbers escapes you, that means for every 9 TV sets sold worldwide in 1993, Sega and Nintendo sold between them one game console. And if the reality of that escapes you, a TV set sold is a TV set sold. Meanwhile, Nintendo sold 45 million game cartridges in 1993 while Sega was selling 25 million. Between them they sold one game cartridge for every 1.4 TV sets sold worldwide.

16-bit games are yesterday's technology. 32-bit is tomorrow's. Sony has announced entry into the game business and plans sale of their PSX 32-bit package in Japan this year; worldwide by 1995. Sony says their technology will bring into the home the graphics and speed of high-end (read highest tech) arcade games including smooth, full motion video and 3-dimensional graphics. Sega, aware it's 16-bit products must upgrade to survive, plans to debut 32-bit 'Saturn' late this year; worldwide by 1995. Sega has worked out a deal with software's Microsoft to allow applications for on-line interfacing (direct connection through telephone or cable two-way systems).

If 32-bit technology is tomorrow's format, 64-bit is a generational leap into the future. Atari's Jaguar is already there, delivering a modest 20,000 units to the US late in 1993, hoping for 500,000 units delivered worldwide this year. Atari believes by skipping past 32-bit technology it has positioned itself with a 24 month technology lead on its competitors. Nintendo has teamed with California firm Silicon Graphics to design a 64-bit system they call 'Project Reality'. They are targeting an end of '95 introduction.

The original games created simplistic graphics that jumped abruptly from screen position to screen position. The new reality is that graphics must look exactly like the real objects they portray and move (when told to do so by the operator) like real objects move. That's the 'reality' part. One of the software directions taken by this approach is reality sex. The 'game player' (that seems inadequate in this context) instructs the software programme on the characteristics he or she desires in the on-screen 'mate', and then directs the 'action' of the screen portrayal. Anything the 'player' can instruct the 'surrogate screen mate' performs. Now add a '3-D reality headset' to the player, and he or she is surrounded with lifelike fully dimensional objects the player has created. With appropriate sound effects. It may prove to be the safest sex of all and a consummate seller for the software creators.

Into this very competitive field now stir in AT&T backed 3DO; a California hardware developer that calls its product REALITY. 3DO has hit the ground running and with AT&T's assistance lined up major firms who will produce its unique hardware format shortly. Panasonic shipped the first 3DO product by year end. A PAL format console began shipping this month. Matsushita itself plans REAL consoles in Japan next month, in PAL format by May. Sanyo will begin shipping 3DO format players by July. 3DO claims 563 licenses for software had been issued as of January but only 40 or so titles are likely to be available by March. AT&T plans to introduce 3DO player telephone interconnects during 1994; two or more people at widely separated locations, tied together courtesy of AT&T, will be able to play competitive on-screen games in real time. It certainly beats playing chess by international sea mail.

Like the VCR/CD video entertainment world, all games are driven by the software available. Sony, for example, has admitted it could bring its PSX 32-bit game package to market very soon if only the software (games) were written and available. All new formats (3DO, Atari Jaguar, et al) suffer this same lead-time problem. Most games are now created by a handful of speciality firms or game writing free-ancers. They collect royalties for games sold, do well when a game does well.

The reality is that there are more game formats now available than there are game formatters. Sony has privately complained about how difficult it has been for them to 'attract game creator attention' with their new product. Game creators, uncertain whether a new format will fly, are not anxious to invest their own time and money into creating a game for Sony, for example, or even 3DO, when established Atari or Nintendo or Sega are knocking on the door asking for more games as well. Games written initially in English have to be software rewritten for Japanese. Games created in NTSC have to be rewritten for PAL. Going worldwide with a new game, as Sega and Nintendo now do routinely, is a rather massive undertaking.

1994. Given the lengthy (year plus) lead-times built into game creation, formatting, production and distribution, Nintendo and Sega seem secure for the balance of this year. But they will make adjustments to reflect the declining state of all Japanese consumer electronics. Sega expects to drop net income 23% for the year ending March 31; the first drop in net income in 12 years. 3DO has the same problem faced by terrestrial TV broadcasters converting to digital TV; until their 'game console universe' is significant, they won't attract big-league game creators. And until they do this, they may not sell game consoles very effectively. 32-bit and 64-bit products (3DO and Atari Jaguar included) are unlikely to have any significant impact before 1995. Both will require a far wider selection of games available to be serious contenders and that takes time. And by the time they get there, Sega's Saturn 32-bit, Sony's PSX-32 and Nintendo's 'Project Reality' will be entering the marketplace. 1995 will be a hell of a year for games.

INTERACTIVITY: THE CONCEPT

Two-way communication or data exchange is what interactivity is all about. A TV watcher with a remote control grasped in the hand issues commands which the TV or VCR executes. This communication is one-way.

A viewer using a remote control to start a preloaded video cassette is issuing a one-way command. The movie appearing on the screen is acknowledgment the command has been received and executed. If the viewer leaves the room but tells the movie to pause before leaving, this is a new command.

Take the videoplayer out of the home and place it several miles away at a local telephone exchange or cable office. The viewer decides he wishes to watch *Gone With The Wind* which has been selected from a long list of movies available and appearing on a 'Movies Available' channel on his TV screen. The TV screen is connected via a set-top box to the telephone or cable company. The remote control sends an infrared message to the set-top box selecting *Gone With The Wind.* The set-top box translates the infrared command to a data text message which it sends on to the telephone or cable company. There a 'programme server' software device selects the Laserdisc or recorded tape copy of *Gone With The Wind* starting an automation sequence that begins by loading the movie selected to a vacant player. At the same time the programme server software programme at the telephone or cable company sends a message back down the line to the viewer's TV set advising the set-top converter to switch to a specific transmission channel. As the set-top makes that switch and verifies it has done so with a text message back to the telephone or cable company, the disc or digital videotape drops into position and play begins. All of this takes far less time to happen then it has taken you to read about it.

If our viewer receives a phone call (which on a telephone system can arrive over the same phone line as the movie using a technology called VoiceSpan), he uses the remote control to pause the movie. At the telephone or cable office the player goes to pause and stays there until our viewer is

ready to resume viewing where upon touching 'resume play' on the remote starts the movie up again from the precise point where it left off. And if the movie watcher wants to review a particular segment, through his remote control he can fast-rewind *Gone With The Wind* to a precise frame.

This is one form of 'interactive television;' a form which for obvious reasons may cause a significant crimp in video rental store business. This is not science fiction future stuff; this is now, today, 1994. By the end of this year more than 1,000,000 US homes will have this service. By 2000, telephone and cable trade associations predict 50,000,000 US homes will be so equipped.

But that is only a small part of what interactive television is all about. If our viewer can select from an on screen listing of movies a particular film, can he or she not also select virtually any programme or sporting event available in the world; then being played or previously played? The answer is yes, subject only to the storage capacity of the programme storage place (i.e., the cable or telephone company). There is nothing special about movies, per se. Any event that can be stored on tape, a disc or a hard drive will be available on demand.

In Quebec's Montreal area interactive cable system, the viewer can buy Lotto Quebec tickets using the remote control. At the same time he is buying his lotto ticket, Hydro-Quebec is sending a pulse down the cable line asking our viewer's electric power meter how much energy the house has used in the past month. The answer will be automatically recorded at Hydro-Quebec on a computer disc which will shortly prepare our viewer's electricity bill for the current month, and post it automatically, untouched by human hands. If our Montreal viewer has selected automatic debit and credit through his account at National Bank of Quebec, our viewer's electrical bill will be paid automatically by direct debit to his checking account at the bank, less than ten seconds after this month's electricity usage was remotely read. Tomorrow morning, when our viewer arises, he will find a hard copy of the transaction waiting in his Hearst Corporation printer attached to his set-top TV converter. Also in the same printer will be an electronically delivered copy of the Montreal morning paper customised for our viewer. Of Anglo-European ancestry, he has given the paper his 'profile' and answered a one-time questionnaire concerning the categories of news stories or features he routinely reads. His customized newspaper is significantly smaller than the street full- version paper because a computer at the newspaper has selected only those stories which fit his reading interest profile.

Science fiction? 2010? Nope; today, 1994, in 34,000 homes growing to more than 500,000 by 1996. An isolated example? Not on your life; similar, even more creative systems are going into cities such as Omaha (Nebraska), Denver (Colorado), and Minneapolis-St. Paul (Minnesota) this year, 1994, to name only three of more than two dozen similar interactive systems being built as you read these words.

How much more creative than Montreal? Well, once you reach the interactive stage, and digital transmission techniques, the only thing holding you back is a lack of software. In Omaha, viewers will have access to full colour on-screen product catalogues. Through the remote control, let's select 'rainwear' from an on-screen self-prompting menu; a series of display pages sent to you from the cable-telephone company office appears on your screen. Using the remote control you leave a single page on the screen for as long as you wish to browse. One raincoat catches your eye. Using the remote control you ask for 'more information.' The screen asks, "*Print or demonstration?*" You select "*both*" following an on-screen prompt. Immediately the printer attached to the set-top converger prints out a copy of the on screen text, in four colour, while on screen a software routine has located a 3 minute recorded sales pitch for the same raincoat product. In the home the customer is given a full demonstration of the product on their TV

screen. At the end of the demonstration our viewer removes the printed copy of the catalogue page from the set-top printer and notes that today-only this raincoat is on sale for 20% off. Deciding to buy, using the remote control again, the viewer turns into a customer and selects "*buy at today's price*" from the on-screen menu. The raincoat will arrive by afternoon courier, with full return privileges. The customer's credit card information, or direct bank debit instructions, were transmitted with the "*buy at today's price*" instruction from a small memory chip held in the set-top converger. In less than ten minutes time, never leaving the kitchen while simultaneously preparing the kid's school lunches, our viewer has shopped for a needed item, selected a particular product, ordered and paid for it still dressed in a bathrobe with her hair up in rollers.

This has to be science fiction; right? Not to 60,000 homes in Omaha by November. This will be the real world.

Still not interactive enough for you? OK, in San Diego you are connected to cable and you have just mastered a new 3DO game. Playing against the computer has worn thin, you'd like to play a real person. Using on screen prompts you find several players listed on screen who average game scores 10-20% better than you. This seems like a challenge so you use the prompts to tell the set-top converger to find you an available player from those listed. You also add your own name to the growing roster by inputting two simple commands on your remote. We'll fast forward what happens next; suffice to say in less than a minute a suitable qualified individual in Rochester, Minnesota is sitting down to play against you. The 1,550 miles separating the two of you is invisible; on the screen you are both present and in real time.

By now you know this is not fantasy. This is 1994.

CABLE TV UPGRADE TO INTERACTIVE

In the United States 11,385 cable TV systems serve 59,100,000 homes (62.5% of all homes) and charge an average of NZ$37.35 per month for what is known as 'basic cable.' Cable TV grew by 3.5% in 1993 in the US. Worldwide the statistics are less well defined; an estimated 135,000,000 homes. In the UK, the number is nearing 600,000 homes but growing very rapidly.

US cable TV runs a wide range from being a simple community-shared master antenna service bringing perhaps 6-10 terrestrial TV channels into the home to 100+ channel interactive two-way systems such as we have described for Montreal. At the start of 1994, 40.07% of all cable homes (some 23.6 million) were 'addressable;' meaning the cable company had technology installed capable of sending a single programme to a single customer at a time. 'Addressable' is not quite the same as 'interactive;' it is more like the relationship with your remote control VCR; the cable company can tell a single home certain things, but it cannot always receive direct response from the cable home.

To be interactive, a cable system must first replace set-top cable converters with two-way interactive set-top convergers. 1,000,000 of these units are scheduled for delivery in 1994; another 3.5 million in 1995. By 2000, more than 35,000,000 should be installed in US homes. Once the interactive set-top converger is in place, individual homes have the capability to communicate in two-way real time with the cable offices. To make this work better, traditional coaxial cable networks are being upgraded with fibre-optic 'mainlines' and subscriber homes are being divided into groups of 500 homes. Each 'node' of 500 will have its own direct feedback network to the cable offices. Simultaneously, at the cable offices hard and software is being installed to interface the subscriber's messages to appropriate 'servers.' This is a system devoted to fulfilling specific requests from the subscribers, such as our Omaha housewife who ordered the raincoat. She did all of this through a single 'catalogue order server' system consisting of appropriate software and

hardware. Within five years the typical cable company will have hundreds of servers installed, each dedicated to performing one or two related tasks, on command, from single or multiple customers.

To equip 35,000,000 US homes for interactive two-way by 2000, the cable industry calculates it will spend approximately NZ$720 per cable subscribing home, or NZ$45,360,000,000. Of this, NZ$14,000,000,000 will be spent on the in-home cable set-top convergers alone. Somebody in the cable business obviously sees some pretty large revenue numbers coming out of American households to justify this sort of expenditure. The competitive-to-cable telephone companies see this as well, as we will discuss shortly.

1994. The first significant year in the expansion to two-way interactive TV in the US. Hardware suppliers, especially in the set-top converger area, will be flat-out trying to reach speed with the technology that is happening all around them. Fixing on a static set-top design has been a major problem; new software concepts are being floated almost daily! This is also the year when established software designers such as Microsoft are completing platforms to drive servers at both ends of the line; inside of set-top convergers, and, at the cable office server as well. And this is the year when more than one million homes 'go interactive' with new high speed access to established services such as CompuServe and Prodigy. Interactive equipment will be refined a great deal based upon this year's first results, and the converger and server hardware will be in very short supply. Unfortunately, as we shall see later in this report, that shortage will have significant impact on the development of a competitive industry; direct to home satellites.

TELEPHONE UPGRADE TO INTERACTIVITY

Telephone companies have no choice; either they upgrade to offer services competitive to cable or they risk ending up like British Telecom in the UK; losing every second customer to a cable TV company that now supplies telephone as an additional service (CTD: 9312, p.28).

Some sizable cable companies are merging or joining corporate forces with large scale telephone operators. A cable firm that operates two or more separate cable systems (in two or more separate communities) is called an 'MSO' or Multiple System Owner. MSO Time/Warner (with 7,100,000 cable homes connected) has joined forces with telephone company US West. NZ$9,000,000,000 will be spent on upgrading telephone to serve up interactive TV programming. Cable's TCI (largest MSO of all serving 10,248,000 US homes) is joining Bell Atlantic as we have reported previously here; TCI was spending NZ$3,600,000,000 during 1993-1994 before the merger to upgrade its cable plants. Southern New England Telephone is investing NZ$8,100,000,000 to equip 10% of Connecticut's homes with interactive capability. Ameritech, operating in the central US in and around Chicago, will convert 6 million of its 12 million telephone customers to interactive by 2000 and spend NZ$8,000,000,000 in the process. California's Pactel plans to equip the majority of that state's telephones for interactive by 2000 at a cost of NZ$28,800,000,000. And the list goes on.

US telephone firms are following two paths to interactivity; sometimes parallel and simultaneously. They are buying existing cable systems outright at prices that vary between NZ$2340 and $3150 per cable subscriber (from 8 to 12 times 'cash flow' per subscriber). And, they are engaging in their own upgrading programmes as noted above.

Threaded through all of this hyper-activity in the marketplace is US President Clinton's legislative plan to create an 'information superhighway environment' to encourage the rapid conversion of existing cable and telco plants to high speed data. Under present US law, telephone companies are denied the ability to operate cable TV services within their own telephone plant physical areas, but allowed to invest in cable in areas outside of these telephone regions. This allows US West, a southwestern telephone company, to invest in Florida or Nebraska cable systems but not Arizona

cable. There is at least the possibility that under Clinton's new legislation telephone companies would gain the right to co-operate telephone and cable in the same physical areas.

Most of the billions being spent by telephone companies is going into replacing telephone copper wire trunk and feeder lines with fibre optics. Some telephone firms investing in cable, such as U.S. West in Omaha, are doing exactly what Telecom New Zealand did for its Auckland suburban test (CTD: 9309, p.2); fibre from the regional telephone office to the kerb/curb and coaxial cable from there into each home. Others, such as Southern New England, plan to use Asynchronous Transfer Mode switching (CTD: 9309, p.11) techniques to avoid the substantial cost of replacing existing telephone customer copper drop (home hookup) wires with coaxial cable.

And in some markets there is a cable operator upgrading to fibre optic interactive two-way at the same the area telco is upgrading to fibre optic interactivity. Washington, D.C. suburb Alexandra, Virginia is one such community. There Jones Lightwave teamed with MCI will go head to head for interactive customers against Bell Atlantic. Both firms are offering full telephone plus cable TV service. Both the telephone and cable industries predict this type of head to head competition will be commonplace within five years.

1994. Jockeying for competitive position is the name of the game. Many cable operators prefer to join forces with a telephone firm and big time financial deals such as the NZ$54,000,000,000 stock deal between TCI and Bell Atlantic will continue to sprinkle the landscape this year. Existing cable systems have a bandwidth advantage over existing telcos because of the confining qualities of old fashioned copper wires connecting telephone customers; that advantage will disappear as telcos spend billions to upgrade their plants. Both telephone and cable are going to the same suppliers for hardware and fibre optic cable; significant shortages of hardware will slow down both industry plans to expand to a schedule during 1994-5. TCI has already announced a modest slow down in rolling out set-top convergers because the two primary suppliers (General Instruments and Scientific Atlanta) are already backlogged on orders extending well into 1995. Bell Atlantic foresaw this equipment-availability bottleneck and went outside normal cable supply circles to sign a deal with a consortium that includes IBM, and Philips plus Compression Labs to produce the in-home convergers; they call their unit a 'Digital Entertainment Terminal' (DET). If Auckland's Telecom test ends up with interactive boxes this year or next, they are likely to be DETs made by this consortium.

Auckland's Telecom test is significantly handicapped by its very modest (600 potential homes) size. With so few customers the costs associated to offer 'video servers' for Movies on Demand, information network access and home shopping are simply too great. If (our) Telecom is serious about testing the new age of interactivity, look for the existing pilot systems to be significantly expanded during 1994-95. To reach a homes-served level sizable enough to afford the 'serving equipment' will require a number in excess 10,000. Perhaps the Auckland test concept was a good one at the time of its inception; unfortunately, now it was too small to test anything meaningful beyond Telecom's ability to deal with angry citizens who object to having their streets, sidewalks and lawns dug up for several months.

AUDIO TECHNOLOGY CHANGES

New Zealand imported 51,241 CD category audio players in 1993 with a combined factory value of $13,389,940. The availability of state of the art music players feeds a New Zealand radio advertising industry that took in $139,000,000 during 1993 and a music sales industry several times as big. Music, directly and indirectly, is a NZ$500,000,000 annual business here.

CD format music is the primary medium but there are two new-tech challengers. CD players imported averaged a factory cost of $261.31 in 1993 against a cost of $227.20 in 1992. The only significant new technology appearing in the CD field is changers. Multiple CD players with built-in changers have been available for several years. The new 'super changers' double as in-home storage units and add the ability to instantly select any CD and any cut without having to handle and load individual CDs to the player. In a world with growing CD libraries, the combo changer-storage facilities have struck marketing nerves worldwide. For 'small collections' Sanyo/Fisher have a 24 CD changer. Most buyers are looking more seriously at Sony and JVC 100 CD changers; Sony at NZ$1,800 and JVC at $1440. Large collections can be housed for instant access in 200 CD changers from Denon, 300 CDs from Pioneer and 360 in Sony's industrial model.

The two new technologies are from Philips and Sony. Philips is now entering the second full year with its Matsushita-partnered DCC tape system. Sony is completing year one with its MD disc system. DCC means using digital technology to record on tape; think of it as CD quality on tape. MD is for minidisc in the belief that smaller is better. Sony's MD system takes standard 5" CDs and compresses them in size without sacrificing quality or play time, throwing in the ability to record as well as playback as a bonus.

Of the two, against established 5" CDs, neither is making much of a dent. Neither format has attracted the interest of the music distributors but Sony has answered that one by establishing its own music pressing plants. It helps Sony that they are in the entertainment field as well, owning chunks of major (US) record and film companies. Supporting Sony with hardware is Alpine, Aiwa, Clarion, JVC, Kenwood and Sharp. Sony shipped 50,000 units in 1993; hopes to ship 100,000 in 1994 at hardware prices that range from NZ$900 to more than $2300. Sharp is introducing a combination MD and CD player-recorder in Japan in March; April worldwide. One of its features (at NZ$1450) allows the user to dub from CD to MD, a music cut at a time, and 'title' the MD cuts with a graphic keyboard; a way to make your own (MD) disc of your favourite music arranged as you see fit complete with cut-locating titles.

Philips plans to launch a combination analogue audiotape and DCC (tape) package in May or June. In January, Philips cut the price on its existing DCC units in Europe by an average of 36%; UK audio journalists labeled it a "*fire sale for distressed merchandise*" in reference to the DCC format failure to attract consumers. Hardware for DCC is made by Alpine, Marantz (owned by Philips), Matsushita, Philips, Philips Japan and Technics. DCC decks that record as well as playback are pricey, even with the 36% discount; up to NZ$2500 for newly released models. Some of the original models are being deeply discounted (Marantz dropped a February 1993 price of NZ$1980 to a January 1994 price of $1080).

1994. A recordable disc system that allows consumers to compile their own music with digital audio quality would seem to be a contender. Sony's resources are likely to back MD for the several years it may take to get the format established. Philips DCC seems less certain, and if there is room for one new format at this time, few in the audio business are betting on Philips. For MD to succeed, prices need to drop to at least half of where they now are. For DCC to survive, it needs prerecorded music plus many more hardware manufacturers supporting the format. For both formats, 1994 will be a difficult year.

JAPAN INCORPORATED

Consumer electronics has paced, even led, the amazing twenty year growth of the Japanese economy. When Sony produced the first Japanese built all transistor radio (1957) products made in Japan were inferior in performance and unreliable. Twenty years down the road from the first Sony 'transistor', Japan had turned from a backward copier of other's technology to a technology leader. The 1980s were Japan's 'Golden Years;' virtually everything Japan touched turned to gold. They led the evolution in smaller, more efficient colour TV sets, in VCRs, audio equipment and later in camcorders. Japanese wage earners prospered, corporate profits went up, and so too did pricing for Japanese goods. Major Japanese consumer electronics manufacturers made sizable investments in nearby Asian country production facilities throughout the 80s, paying for the development of assembly plants in Thailand, Indonesia, Malaysia and Taiwan. It was 1990 that Japanese growth first faltered. By 1993 it had faltered four straight years and there was no denying that Japan Inc. was in financial trouble.

Matsushita projects the worldwide market for colour TV sets to be 87,500,000 units in 1994; growing to 100,000,000 per annum in 1997. As noted earlier, Japan will import more colour TV sets in 1994 than it exports. Matsushita is aggressively chasing 10% of the TV set world market for 1994; virtually none of these Matsushita TV sets will be assembled in Japan.

The cost of doing business in Japan has skyrocketed so much that Japanese assembly lines, no matter their high use of automation, can no longer compete with less expensive foreign labour staffed assembly lines. That alone is why much of Japan's consumer electronics production is being done outside of Japan. Sharp, Sony and many others have found it is actually more profitable to build and staff assembly plants in America than to build TV sets for the US market overseas and ship them to America. It has been a long time since American assembly costs were lower than Japan. It is no coincidence that Japanese auto makers have also greatly expanded their American assembly plants for precisely the same reason.

To be accurate, not all of Japan's declining consumer electronic industry can be blamed on the high costs of doing business in Japan. During 1993 the exchange value for the Japanese yen hovered between 102 and 110 yen to the US dollar ($1.80-1.90 in kiwi dollars). This made many Japanese products unprofitable to manufacture for the American market. The Japanese blame the yen exchange rate for many of their present problems.

JAPAN INC: HOW BAD 1993?

Company	1993 CE Sales *	Net Income **
Pioneer	-6.6%	-69.2%
Sony	-8.7%	-23.7%
Mitsubishi	-3.0%	-23.0%
Sega		-23.0%
Sanyo/* **	-4.7%	-22.0%
Nintendo	-6.2%	-21.8%
Hitachi	-1.9%	-20.4%
Matsushita	-10.0%	-14.0%
Sharp	-4.3%	-13.2%
Toshiba	-12.0%	-4.8%

*/ 1993 Consumer Electronic sales compared to 1992 CE sales; first 6 months current year.
**/ 1993 net profit on consumer sales compared to 1992; first 6 months current year.
*** / First 9 months 1993.

There is a third factor; a lack of new consumer electronic technology. EIAJ (the Japanese electronic trade association) in a '93-year-end report noted:

"Japanese output will be further hindered by the lack of a leading product to spur new significant demand." Translation: During the 80s, every two to five years saw a 'hot new consumer product.' By 1990 new products were waning; by 1993 new products were gone. Japan for 20 years has been quick to recognize a new product area (such as the first all transistor radios), refine the product into consumer desirable packages, and

run with it. The last 'run-with' product to come along was the camcorder and it is now going on 12 years old in the consumer field.

EIAJ has these somber studied projections for Japan consumer electronics in 1994:

1) Overall CE output / will fall by 3.4% from 1993 (fell 12.7% in '93, 19.9% in 92)

2) VCR production will fall 5.1% from 1993

3) Colour TV production will be down 1.9% after a 10.2% fall in 93, 10.5% in 92

1994. Japan is adjusting to four consecutive years of dwindling shipments, profits. For Japan, the consumer analogue era is already over and this is the first of two transition years to the rush of digital. Individual companies are moving more production lines to other Asian countries, Europe, the USA. Engineering staffs are being reassigned, largely to new digital products scheduled for 1995/1996 introduction. Sony is diversifying, putting more money into the software (computer programming, movies, audio discs) and could actually disappear as a manufacturer of consumer electronics hardware within ten years. With analogue all but finished, don't expect many new innovations in consumer TV products until digital hits the marketplace. Matsushita is one company to watch; against the trend it is increasing sales efforts and after shipping 500,000 of their 1993-new GAOO TV line, expects to ship 1 million GAOO sets this year. There will be product shortages in all areas of consumer video electronics, growing more severe in 1995. Japan could actually 'force' the transition to digital by shrinking analogue-only production lines and if they do this, digital might become the next 'hot product' to rebuild their consumer electronics industry.

SATELLITES: EMPHASIS ON THE PACIFIC

As CTD has reported (9312,p.2; 9401,p.2) 1994 is the first of a two year explosion in new satellites. With two new C plus Ku bands Intelsats this year (177 and 180 east), and our first non-Intelsat owned satellite (PanAmSat PAS-2 at 169 east), the only thing missing is programming.

Viacom (owner of MTV, Nickelodeon, VH-1) has signed an agreement to use PAS-2. That's the first suggestion that PAS-2 may have a shot at becoming the 'direct to home/cable headend' satellite of choice for the Pacific. With both high power C and Ku band transmitters on board, PAS-2 could end the freeze on available Pacific programming.

Thomson Electronics sees a "*Significant market for DSS* (direct to home satellite at Ku band with small dishes) *in the Pacific.*" Thomson's NZ$1200 priced US DSS receiving package goes on sale in April as the new 150 channel service called DirecTv kicks off. The technology being employed by DirecTv is likely to migrate to the Pacific by 1996-97. Here's how it works.

All transmissions are digital. The home viewer is isolated from channel or transponder numbers and is presented with on screen menus that advise what programmes are available across the 150 'channels' at all times. The viewer selects 'programmes', not channels and DirecTv will move programming around from 'channel' to 'channel' based upon the programme load at any point in the day.

Programming is 'bundled' in groups. A bundle might consist of 2,4, up to 20 separate programmes. For distribution throughout the world, rather than shipping individual programmes via individual transponders, 'bundles' will be transferred. Thus a satellite such as PAS-2 could receive for redistribution in the Pacific a 'bundle' of up to 20 separate programmes which in turn it would pass on to the entire Pacific on a single (analogue style) transponder/channel. This allows bundles to be marketed as 'packages' and greatly reduces the costs of transporting, managing and marketing the US originated signals to other segments of the world. The hardware/software to move bundles around will be in place in 1995. Once this happens, all of the rules will change.

-FEBRUARY 25th UPDATE - PACIFIC SATELLITES-

177W/Intelsat 503: Ageing inclined orbit (4.3 degree) now being replaced with 510 (inclined orbit 1.3 degrees). Primary use is Ku spot beam TV relay Japan-USA (not visible South Pacific).

180/Intelsat 508: Inclined orbit (now 2.3 degrees) increasing to 3.0 degrees end of year; scheduled replacement with newer 701 April 1996 when inclination will reach 4.2 degrees. Primary TV satellite for Pacific C band.

177E/Intelsat 511: Ageing inclined orbit now 1.3 degrees; scheduled to be replaced with 703 this October. AFRTS B-MAC scrambled here; AFRTS-radio sub-carrier unscrambled.

174E/Intelsat 701: New January, primary 'telephone'/data satellite Pacific; occasional unscheduled video.

169E/PanAmSat PAS-2: May launch now delayed; likely re-schedule June or July. Will be C + Ku.

When the bundle technology is functional, a home satellite viewer in New Zealand will set his receiver to a single transponder, and then 'fine tune' through the (up to 20) separate programmes on that 'channel.' Access to each programme in the bundle will depend upon the home viewer having the necessary 'authorization' for the satellite receiver's decoder package.

1994. A year of technical adjustment. For the South Pacific, excitement as new satellites come on line and reveal their technical capabilities. There has been a minor hiccup in the scheduled May launch date for PanAmSat PAS-2 following the launch-loss-disaster of two European satellites late in January (see this issue, page 32). For programme hounds, 'not the year.' Our new satellites are a year or two 'early' to properly fit into the switch to digital bundling; but they will be ready and positioned to bring considerable new programming our way beginning in 1995. From the business side, 1994 will be the year to arrange for importation and distribution of hardware so that as the programming comes on line in 1995, businesses are ready to supply the system equipment Kiwi dish owners will require. Don't expect delivery of new digital satellite receivers or satellite-version convergers this calendar year. The same people who will make cable TV convergers will eventually also get to satellite TV versions; but it is unlikely to happen before early 1995. If you are serious about getting into home satellite TV systems in the future, attend a satellite trade show - someplace - in 1994 to bring yourself up to speed on what it is really all about.

THE 1993 IMPORTS

New Zealand consumer electronic imports set no records in 1993. Statistics New Zealand has maintained 'similar category' records only since 1988 making previous year imports difficult to separate and compare.

Products are measured by (a) quantity imported, (b) Kiwi dollar value at the point of import (so-called 'factory price'), and, (c) country of origin. Similar category records since 1988 allow a six-year tracking of changes.

There are five principal categories of interest to us: Colour TV sets, Black and White TV sets, VCRs, Camcorders and CD players. Generally speaking there is a minimum markup of 100% between 'factory prices' at import and retail pricing in stockist shoppes; in some noncompetitive categories the markup exceeds 100% by a wide margin. Virtually all products go through a minimum of two-steps from import dock to stockist where retail pricing applies. The importer sells to a distributor, who marks up the product before selling it to the retailer who in turn marks it up. Some retail chains such as The Warehouse eliminate the middle, distributor, step and thus have lower stockist level pricing.

Country of origin, where the products are made, has a profound impact upon the ultimate stockist pricing. Japan, for example, supplied New Zealand with but 8.49% of the colour TVs imported during 1993. But, in terms of dollars, Japan accounted for 23.85% of the outflow of

New Zealand dollars for 1993 colour TV sets. Korea, on the other hand, supplied 16.81% of our 1993 colour TV imports but extracted from the New Zealand economy only 11.52% of the money spent overseas for this category of product. This is another way of measuring the degree of difficulty being experienced by the Japanese consumer electronics industry.

GROWTH AND DECLINES

In computing the following charts and tables, CTD first analyses the total imports in any category, comparing 1993 numbers to similar category numbers for each year back to 1988. The six year span is averaged and the 1993 totals are compared to that six-year average. But in products such as Camcorders where imports were very small in 1988, the six year average is more a measure of long term growth than year to year marketplace variations. So we then compare the 1993 imports against those for 1992 to reveal the most recent year to year change. For each year we also compute the 'average price per imported unit' for each of our five categories. Changes in the annual average price reflect a number of factors; world pricing on units, the relative strength of the New Zealand dollar to the various trading partner currencies, and a maturing of unit pricing as each respective product technology becomes more advanced.

Where the data is available from Statistics New Zealand we also break down product categories by country of origin and show the average New Zealand cost per unit from each country. Again, the differences can be quite dramatic (TVs, for example) for the same screen size but originating in different countries.

Finally, we compare similar category data from New Zealand, the USA and 'Western Europe' to show how the sales trends (1992 to 1993) and the prices per unit (converted to Kiwi dollars) stack up. The New Zealand marketplace does differ, often quite markedly, from sales trends elsewhere. In Colour TVs, for example, New Zealand recorded a 1992-1993 unit decline of 5.54% while Europe was sliding 0.45% and the US was growing 12.1%.

COLOUR TVs / ALL SIZES

In six years New Zealand has imported 1,156,113 colour TV sets; or almost precisely one new colour TV for every household in the country. In that six year period the average price of all TVs imported was $433.02. In 1993 the quantity imported was 192,686 (down 5.54% from 1992; up

COLOUR TV/6 YEARS

Quantity is number of units for the year; Avg Value is import value per unit. NES is a category within 'colour TVs' that presently defies description; see text. NES category is included within year total for each year.

	YEAR 88	YEAR 89	YEAR 90	YEAR 91	YEAR 92	YEAR 93	AVG/6yr
Quantity	141,791	166,391	213,391	214,064	216,496	203,980	192,686
Avg Value	$297.79	$411.75	$393.05	$455.79	$525.14	$514.58	$433.02

	YEAR 88	YEAR 89	YEAR 90	YEAR 91	YEAR 92	YEAR 93	AVG/6yr
NES/units	979	1,636	1,337	35,939	42,062	63,211	24,194
NES/value	$1483.63	$2196.51	$1833.36	$424.05	$367.68	$299.65	$1100.81

5.86% from the 6 year average) at an average price of $514.58 (down 2.01% from 1992, up 18.84% from the 6 year average).

Our table shows an 'NES category' which we share with you more out of bewilderment than any specific value. Importers are required to show the screen sizes on all import documents. TV sets that are 'Not for broadcast TV reception' and those not screen size declared end up in the NES category. A TV set 'not intended for broadcast reception' would be a very strange device indeed. In 1988 NES amounted to 0.0068% of all units imported. By 1991 it accounted for 14.37% of units; in 1993 24.69%. We have drawn this unexplained trend to the attention of both Statistics New Zealand the Tariff Policy Division of the Ministry of Commerce but to date do not have a satisfactory explanation of what this trend is telling us.

BLACK AND WHITE TVs

Black and white TV sets have become a 'nonevent' in New Zealand, although it does appear some computer screen devices may be slipping into the country under this broad tariff category in recent years. For all TV's imported in 1993, B&W accounted for 2.14% (even with possible computer screen 'pollution' of the numbers). In 1988 B&W accounted for 7.50% of all units imported. During 1993: imports fell 28.03% from 1992, average cost per unit fell 27.89%. With possible computer device pollution, the average import cost per unit was $283.05 in 1993 with 4,465 units imported. For comparison, in the USA B&W sets accounted for 15.2% of 1993 imports with an average value of NZ$129.60.

VCRs

In the six year period New Zealand has imported 650,132 VCRs at an average import cost of $451.72. If ALL VCRs imported prior to 1988 were excluded, the penetration of New Zealand homes with VCRs would be approximately 54.18%. With prior imports, the penetration is believed to be in excess of 81%. In 1993 the quantity imported was 106,808 (up 12.92% from 1992; down 0.32% from the 6 year average) at an average price of $478.82 (down 3.13% from 1992, down 5.66% from the 6 year average).

VCR UNITS/6 YEARS

Quantity is number of units imported for year; Avg Value is cost per unit during year cited.

	YEAR 88	YEAR 89	YEAR 90	YEAR 91	YEAR 92	YEAR 93	AVG/6yr
Quantity	83,448	157,812	112,499	94,980	94,585	106,808	108,355
Avg Value	$458.36	$437.38	$429.91	$411.55	$494.30	$478.82	$451.72

CAMCORDERS

In the six year period New Zealand has imported 131,116 handheld TV camera/recorder units at an average cost of $1,234.21. On a household basis, during the six year term this represents about a 10% penetration. There is some 'pollution' of the numbers caused by the common-grouping of professional broadcast TV camcorders into the same tariff category. It doesn't take very many $120,000-per-unit camcorders to contaminate the average price calculation although the number of such units annually is very small.

In 1993 the quantity imported was 22,942 (down 24.82% from 1992; up 5.21% from the 6 year average) at an average price of $1,224.96 (up 4.41% from 1992; down 0.76% from the 6 year average).

CAMCORDERS/6 YEARS

Quantity is number of units imported per year; average price is price per unit.

	YEAR 88	YEAR 89	YEAR 90	YEAR 91	YEAR 92	YEAR 93	AVG/6yr
Quantity	9,307	20,436	22,920	24,930	30,581	22,942	21,853
Avg Value	$1469.10	$1290.85	$1144.68	$1102.93	$1173.22	$1224.96	$1234.21

CD PLAYERS

In the six year period New Zealand has imported 343,288 'CD players.' The tariff category, however, leaves something to be desired since it is inclusive of home style as well as 'portable' units. This causes a 'price contamination' for averaging and makes more difficult comparison to other countries where portable units are counted and tallied in a separate category. With that caveat, in 1993 the quantity imported was 51,241 (down 36.99% from 1992; down 10.44% from the 6 year average) at an average price of $261.31 (up 15.01% from 1992; up 16.99% from the 6 year average). Note in table here the 'significant' peak in the product category (quantity) during 1992, making it a tough act to follow in 1993.

CD PLAYERS/6 YEARS

Quantity is number of units imported; Avg Value is price per unit.

	YEAR 88	YEAR 89	YEAR 90	YEAR 91	YEAR 92	YEAR 93	AVG 6yr
Quantity	24,975	63,614	70,661	51,471	81,326	51,241	57,215
Avg Value	$225.51	$214.17	$193.06	$212.92	$227.20	$261.31	$222.36

IN OR OUT OF CABINET?

New Zealand imports a sizable percentage of its TV receivers without a cabinet; adding locally produced cabinets here. In our Country Of Origin table we show which countries supplied receivers without cabinets to New Zealand by TV screen size. The dollar savings by adding cabinets here to foreign built electronics is not as dramatic as you might suspect; in fact in two cases it costs more to bring in a TV chassis without a cabinet than it does to bring in one with a foreign built cabinet. Korean TV sets with screens greater than 560mm in size cost 34.77% more to bring in without cabinet than with. Similarly, Singapore built sets greater than 560mm screen size cost 7.69% more to import without a cabinet. For those gaining an 'advantage' by supplying the cabinet here, the range is from 6.49% to 14.93%. How this translates at 'retail' is unknown.

Of 203,530 TV sets 'counted' in 1993 imports, 29,990 (14.74%) arrived without cabinets. The leading size category was sets with screens greater than 330mm but no more than 360mm (11,082

sets out of 72,356 or 15.32%) while the size category least affected by non-cabinet shipping was 360mm to 460 mm (31 units representing 0.88% of that category total). See also Country of Origin.

IN/OUT OF CABINETS 1993

By screen size, number of units in both categories and % of total in category. Changes from 1992 to 1993 were not significant.

	<330mm	330-360mm	360-460mm	460-510mm	510-560mm	>560mm
In Cab/#	1,534	61,274	3,490	36,646	28,326	42,270
In Cab/%	38.76%	84.68%	99.12%	96.06%	72.32%	91.14%
Out Cab/#	2,424	11,082	31	1,502	10,840	4,111
Out Cab/%	61.24%	15.32%	0.88%	3.94%	27.68%	8.86%

COUNTRY OF ORIGIN

As previously noted, where a piece of equipment is manufactured has a very significant impact on the import price of the unit. Few would argue against the very high quality of Japanese TV receivers, for example; but, are such receivers worth on average 253.63% of a set of identical screen size built in China, or 223.10% of a set built in Korea, or, 173.93% of a set built in Australia, or, 127.29% of a set built in the UK? Those are the premiums paid for sets in the over 560mm category.

COUNTRY OF ORIGIN/TV SETS IN CABINETS

For each country of origin the table shows the total number of receivers (top line), the percentage of the total (including sets without cabinets) in that size category represented by the number of receivers (second line) and the average price per receiver from that country for that size, both in and out of cabinets. Sets without cabinets are detailed separately.

ORIGIN	<330mm	330-360mm	360-460mm	460-510mm	510-560mm	>560mm
Australia						3,584 7.65% $866.89
China		7,459 10.31% $230.10		4,117 10.79% $304.26		1,911 4.08% $594.48
Hong Kong	755 19.08 $222.06	7,452 10.30% $245.36		6,242 16.36% $310.85		1,761 3.76% $630.00
Japan					1,540 3.93% $1,281.22	14,516 31.00% $1,507.80

COUNTRY	<330mm	330-360mm	360-460mm	460-510mm	510-560mm	>560mm
Korea	64 1.62% $323.16	13,240 18.30% $259.49	206 5.85% $425.59	10,595 27.77% $380.40	6,929 24.60% $387.86	2,701 5.77% $675.83
Malaysia		22,676 31.34% $341.36	2,018 57.31% $441.26	10,382 27.22% $430.97	13,601 34.73% $552.23	5,790 12.36% $917.04
Singapore	696 17.59% $289.68	9,495 13.12% $298.14	1,252 35.86% $374.95	5,256 13.78% $398.11	4,942 12.62% $484.72	11,373 24.29% $944.52
Taiwan						
UK						954 2.04% $1,184.56
Total Units	3,958	72,356	3,521	38,148	39,166	46,831
Avg Unit $$	$225.82	$303.65	$420.39*	$377.06	$510.73	$1,092.55

*/ 360-460mm apparently contains high priced TV studio monitors causing abnormal upward pricing 'bubble.'

COUNTRY OF ORIGIN/TV SETS WITHOUT CABINETS

Colour TV sets imported without cabinets made up 14.74% of all TV sets imported in 1993. Below, first line is number of sets from country in non-cabinet category. Percentage is of ALL sets in size category, including those with cabinets. ($XX) is average price, same country, WITH cabinet. Last $XX is without cabinet.

Country	<330mm	330-360mm	360-460mm	460-510mm	510-560mm	>560mm
Japan						1,257 2.68% ($1,507.80) $1,358.75
Korea						510 1.09% ($675.83) $910.80
Singapore		2,583 3.57% ($298.14) $259.41		1,400 3.67% ($398.11) $366.03	10,790 27.55% ($484.72) $455.20	2,340 5.00% ($944.52) $1,017.13
Taiwan	2,137 53.99% $145.62	8,274 11.44% $388.39				

UNITS PER COUNTRY/TV SETS

One of the more universal measurement techniques is to list the countries from which goods are imported, and to 'count' either the number of units imported, or the dollars spent for those units, for comparison. In the colour TV set area, countries are listed by rank from top to bottom in two ways; first for number of (TV set) units shipped to New Zealand in 1993, then for the dollar value of those shipments. Note that approximately 12 other countries (not listed) also supplied equipment which totaled under 3,200 units (1.57% of total).

COLOUR TV ORIGINS/BY UNITS

Country	# TV Sets	% Total
#1/Malaysia	54,467	26.70%
#2/Singapor	50,127	24.57%
#3/Korea	34,285	16.81%
#4/Japan	17,313	8.49%
#5/HongKng	16,210	7.95%
#6/China	13,487	6.61%
#7/Taiwan	10,411	5.10%
#8/Austral.	3,584	1.76%
#9/UK	954	0.05%

COLOUR TV ORIGIN/BY DOLLARS

Country	TV Set $$	% Total
#1/Singapore	$27,205,991	24.91%
#2/Japan	$26,050,092	23.85%
#3/Malaysia	$25,924,364	23.73%
#4/Korea	$12,585,935	11.52%
#5/HongKng	$ 5,245,525	4.80%
#6/China	$ 4,276,084	3.91%
#7/Taiwan	$ 3,579,445	3.28%
#8/Austral.	$ 3,185,856	2.92%
#9/UK	$ 1,185,428	1.09%

UNITS PER COUNTRY/ALL CONSUMER ELECTRONICS

When you combine the imported goods in five primary consumer electronic (CE) categories, Japan becomes the largest single supplier to New Zealand with more than twice the imports to New Zealand of second-place Singapore. In the table here, all imports in all five categories are totaled, even when they may amount to but a few hundred dollars within a category.

COMPARISON OF CE UNITS TO SOURCE COUNTRIES/ RANKED BY $$

All categories including the nonspecific 'NES' are included here and totaled by country. In Camcorders Japan accounts for 99.5%; VCRs 55.83%; CD players 63.78%.

Country	Colour TV	B&W TV	VCRs	Cam-corders	CD Players	NES Shipmnts	Total $$	% Total
#1/Japan	26,050,092	54,142	33,074,377	27,422,586	8,384,704	1,236,689	96,222,590	43.29%
#2/Sngpr	27,205,991	(none)	117,282	(none)	1,049,979	15,290,903	43,664,155	19.65%
#3/Mlysa	25,924,364	(none)	12,387,455	(none)	805,054	252,734	39,369,607	17.71%
#4/Korea	12,585,935	240	4,101,527	370	287,987	2,967	16,979,000	7.64%

Country	Colour TV	B&W TV	VCRs	Cam-corders	CD Players	NES Shipmnts	Total $$	% Total
#5/HgKg	5,245,525	48,125	921	(none)	7,964	(none)	5,302,535	2.39%
#6/China	4,276,084	243,221	(none)	(none)	528,188	28,880	5,076,373	2.28%
#7/Tawn	3,185,856	194,933	697	(none)	231,402	517,678	4,524,155	2.04%
#8/Astrl.	3,185,856	(none)	54,189 *	115,554 *	175,554	362,360	3,893,609	1.75%
#9/UK	1,185,428	236	535,069 *	2,000	254,200	(none)	1,976,933	0.89%

*/ Includes broadcast/industrial non-consumer grade equipment; UK VCRs (for example) averaged $107,814 each.

WORLD CE PRICING

Virtually every product manufactured is priced according to the same pricing formula regardless of where it is destined to be sold. 'Bargain priced shopping', in Singapore and Hong Kong, is now largely an illusion in the consumer electronics field. The perception of savings usually applies only to non-brand-name goods for which the buyer has no real knowledge of normal pricing, aware only that 'This 360mm colour TV costs less than another 360mm model at home.'

Colour TVs, VCRs, camcorders and with some reservations CD players can be compared on a worldwide basis using import records for each area. At the end of 1993, those comparisons for the year just passed are shown here. Sales and local taxes aside, a price is now a price, 'worldwide.'

	New Zealand	USA	Western Europe
CD Players	1993/ $261.31	1993/ $315.00	1993/ $265.63
Colour TVs (average all)	1993/ $514.58	1993/ $568.80	1993/ $690.58
VCRs	1993/ $478.82	1993/ $415.80	1993/ $577.24
Camcorders	1993/ $1,224.96	1993/ $1,137.60	1993/ unknown

All prices in New Zealand dollars at rate of $1.00 US equals $1.80 New Zealand. Prices from respective trade organizations (USA, Europe), and, Statistics New Zealand.

Finally there is the matter of 1993 consumer electronic sales trends as measured by the importation and/or local manufacture of equipment for those countries/regions where goods are produced locally. Pluses and minuses reflect 1993 sales changes to 1992.

	New Zealand	USA	Western Europe
Colour TV Sets	- 5.54%	+12.10%	- 0.45%
VCRs	+12.92%	+ 1.05%	+0.82%
Camcorders	-24.82%	+ 9.74%	unknown
CD Players	-36.99%	- 7.34%	+4.92%

TECHNOLOGY
BYTES
...BITS AND BYTES YOU MAY HAVE MISSED IN THE RUSH TO MAKE A BUCK ... BITS

SATELLITE TV

Viacom, major cable and network programme producer in USA, has signed agreement with PanAmSat to lease transponder space on new PAS-2 satellite scheduled for mid-1994 operation at 169 east. Viacom has not announced which of its many programming services (such as MTV) it will transmit through PAS-2 but PanAmSat spokesperson claimed Viacom had decided on their satellite because *"We have designed our satellites for direct to home broadcasting, as well as to cable headends."* Viacom will also be utilising PAS-3 (Atlantic Ocean) and PAS-4 (Indian Ocean) to reach South America, and Africa/Asia respectively.

Ku band 'channelling' for New Zealand/Australia is made more complicated by unusual mixture of Aussat/Optus, PanAmSat and Intelsat. The original Ku band allocations were typically 500 MHz wide (i.e., 12,250 - 12,750 for Aussat/Optus) and this paralleled C-band assignment from 3,700 to 4,200 MHz. All of this allowed receiver manufacturers to create 'standard' receivers with i.f. (intermediate frequency) range of 950-1,450 MHz. The Ku or C range 500 MHz wide bands were simply frequency-converted downward to the receiver i.f. of 950-1,450, and the receiver functioned on both Ku and C by merely changing the low noise block downconverter (LNB) from one band to the other. Life became more complicated when European Ku band users mixed two separate, more or less side by side, frequency ranges into a common service. The original frequencies set aside for DTH (direct to home) telecasting (a 500 MHz wide band), and, the original frequencies set aside for 'commercial fixed satellite service' (FSS; another 500 MHz band) somehow became blurred with satellites in both bands electing to serve both FSS and DTH customers. At this point the LNB makers and the receiver makers had to create products that worked over a range of not 500 MHz bandwidth but more than 1,000 MHz. The alternative was to **(a)** provide DTH viewers with two separate LNBs (each with its own input frequency range but the identical 950-1,450 MHz output range), **(b)** an LNB with an internal 'switch' which the user could 'toggle' to select either the FSS or the DTH bands, or, **(c)** build one LNB with a 1,000 MHz bandwidth i.f. output (such as 950-1,950) and then create a new breed of receivers which also functioned from 950 to at least 1,950. After some fumbling, the industry settled on the latter and now most European LNBs cover a range from at least 10,900 to at least 12,750. Subtracting the smaller from the larger, we have 1,850 MHz (megahertz); thus a receiver that was designed to tune through the full range of frequencies now in use for Europe would require an i.f. of 1,850 MHz bandwidth. Such a receiver is not yet on the market and could prove a considerable challenge in bringing to market. To solve this problem, receivers now connect to LNBs with a 'toggle' or switch; the LNB inputs 10,950 through 12,750 (1,800 MHz wide) and the receiver it connects to tunes typically 950 to 2,050 MHz (1100 MHz). To cover the full input bandwidth of 10,950 to 12,750, the receiver must basically tune through its 1,100 MHz wide i.f. range 1.64 times; i.e., use its i.f. first to tune 10,950 to 12,050, and then after toggling a switch to cause the LNB to change input frequencies, tune once again from 950 (corresponding now to 12,050) upwards to 12,750 (corresponding to 1650 MHz). Confused? No need. For the time being, PanAmSat PAS-2, Intelsat 701 and 703, and Aussat A2/3, Optus B-1 are not nearly as frequency-diverse as the European satellites. They will be transmitting as follows:

INTELSAT 701/703: Transmitting 11,700-11,950, and, 12,250-12,750.
PanAmSat PAS-2: Transmitting 12,250-12,750.
Aussat/Optus: Transmitting 12,250-12,750.

The lowest frequency here is 11,700 and the highest is 12,750; a difference of 1,050 MHz. This means a receiver with an i.f. of 950-2050 MHz will 'fit' the spread of all of these series satellites. Now, ideally, there would be an LNB that covered just the range 11,700 to 12,750, placing 11,700 at 950 and 12,750 at 2000. At this point in time no such LNB is sold but Telsat Communications Ltd. (PO Box 1537, Palmerston North; 06-356-2749) does have new Chaparral brand LNBs which do cover the full 10,950-12,750 range. Included is a new 0.6 dB noise figure LNB for the Optus frequencies of 12,250-12,750. Bottom line? Those existing satellite systems with 950-1,450 MHz i.f. receivers (almost

everybody now in New Zealand with a satellite receiver) will need to trade-up to a 950-2050 MHz i.f. receiver if you plan to receive all three families of Ku band satellites.

Solar radiation originating in active sunspot group on sun's surface enveloped earth's magnetic fields January 20th causing control problems for several geostationary satellites. Worst hit, 1991 launched (Canadian) ANIK E-2 at 107.3 west suffered irreversible gyroscopic control circuit damage, has been abandoned in space. E-2 was major provider of Canadian domestic radio and TV relay services with both 'C' and 'Ku' bands on board; loss in excess of NZ$180m. Anik E-1, at 111.1 west also suffered similar damage but ground controllers were able to 'patch around' damaged section to restore degree of usefulness for satellite. Both satellites were built by GE Aerospace (now Martin Marietta Aerospace). Bursts of unpredictable solar radiation have done damage to RCA and Western Union satellites in past (1978, 1980) but complete loss of a satellite was a first; there was no insurance cover. Intelsat reported some 'dangerous electrical currents' were detected in several of their Atlantic Ocean region satellites during same solar event, credited a special 'shield' and 'electrostatic discharge hardening' of circuitry for minimising damage.

Turksat I and Eutelsat II F-5 satellites were lost during Ariane rocket launch January 24. Ariane experienced a round of 'third stage booster rocket' malfunctions in late 80s (last launch loss was 1990) but Ariane spokesperson claimed this loss was not a repeat of the earlier failures blaming "abnormal overheating of third stage turbo pump" for rocket catastrophe. Turksat I was to be first of two Turkish run regional satellites; number II is scheduled for July launch and will now become 'number one' in operation. Eutelsat F-5 was to have expanded television relay services in Europe; no immediate replacement is planned. Turksat and Eutelsat had combined insurance coverage of NZ$630m. Ariane is delaying next scheduled launch (Intelsat VII F-2) into March from late February original date and May Launch of PanAmSat PAS-2 for Pacific is also delayed pending loss-study outcome.

DirecTv, North America's new 150 channel digital TV to the home service designed around 457mm minidish and NZ$1200 receiving package, begins 'beta testing' March 1 using approximately 500 test homes in Indianapolis and southern California. Testing then expands in April to include up to 20,000 homes in between 8 and 12 'market areas' across southern USA. Thomson designed and manufactured receive systems are being sold under RCA DSS (Direct Satellite System) branding and more than 2,000 retail outlets have been signed to handle the packages including some Sears Roebuck and Circuit City stores. DirecTv forecasts 10% of American homes will have DBS equipment by 2000 with US$700m in sales during first full year of operation. Service is using Hughes built DBS-1 satellite launched in December, a second co-located satellite is scheduled for July-August launch giving programme packagers full 150 digital channel compliment. Of the 150 channel total, 40 have been set aside for pay television movies and 30 to pay sporting events; remainder will include established cable services such as HBO, Showtime, ESPN et al. Two separate programming companies share the 150 channel universe, each offers its own packages giving consumers two choices for programming companies and dozens of packaged plus premium programming choices. Base rate for 20 'channel' programme package is in the vicinity of NZ$40 per month in effort to be price-competitive to existing cable TV rates in much of USA. In addition to packaged movie and sporting channels, individual programmes designed to appeal to special interest groups will also be available on a per-programme or per-topic basis. Financial company Dow Jones recently signed on to produce 30 minute daily 'infocast.'

Although 12 GHz DBS DirecTv is 'new technology on the block', more than 3,500,000 US homes already own satellite TV dish receiving systems with another 1,000,000 in neighbouring Canada, Mexico. 1993 was 'banner year' for industry that relies primarily on 4 GHz satellites with typical 2 to 3m home dishes costing in region of NZ$3,500 installed. 1993 sales were up 112% from 1992, 183% from 1991 averaging 27,000 new systems per month (324,000 for year). How would those numbers translate to New Zealand? At same 4% saturation of Kiwi homes, there would now be 44,000 New Zealand dish equipped homes. And sales in 1993 would have been 3,630 units. Home dish industry in USA launched in 1980, had meteoric rise during 1984-85 to annual sales equivalent to New Zealand selling 790 units per month, went into slump following introduction of scrambling in 1986. 1992-93 bounce-back has primarily been due to public dissatisfaction with monopoly pricing of many cable systems, expansion of satellite available programming to more than 300 channels; nearly three times level available in best equipped cable systems.

British Sky Broadcasting record NZ$178m profits for the six month period ending 31 December was an improvement of 493% over the same six month period in 1992. In 12 month period ending 30 June 1993, BSkyB had a profit of NZ$212m and at that time they were forecasting 30 June 1994 year end profits of NZ$540m. While growth in most recent six months is impressive, it leaves NZ$362m or 67% of their forecasted 30 June 1994 earnings to be 'found' in six month period now underway (BSkyB was at a level of NZ$8.1m profit per week in mid-December). Murdoch's Asian satellite TV service, Star TV, reported a 'small' loss in the period ending December but claims an audience of 42,000,000 households.

BSkyB 'piracy', using Irish formatted 'Smart Cards' now advertised and sold openly in virtually every European country (including UK), is taking a heavy percentage of the BSkyB business away from that company's revenue stream. BSkyB had won a court restraining order stopping Satellite Decoder Systems (SDS) from advertising for sale or distributing its BSkyB knockoff cards this past October in the UK (**CTD**: 9311, p.19). BSkyB, buoyed by the 'easy win' in a London court promised to take SDS to court in other jurisdictions; Ireland was next. Early this month the Irish High Court ruled the SDS cards did not breach copyrights owned by BSkyB and News Datacom. Sky had argued in court that the particular algorithms (mathematical instructions written into their Smart Card) had been 'copied' by SDS. The question was not 'copyright' of the TV programming (which, in fact, BSkyB seldom owns being a distributor, not a creator, of TV programming) but rather the 'copyright' attached to the Smart Card decoding sequence. The court found that SDS claims it had written its own, proprietary, algorithm to decode the BSkyB programming was more believable than BSkyB claims that SDS had breached the security of the BSkyB Smart Card, extracted the BSkyB algorithm, and copied it for redistribution outside of the Sky TV marketing channels. SDS is one of several dozen firms who are in the 'piracy card' marketplace in Europe although popular European satellite user's magazine **Telesatellit** quite correctly reports only a few of the cards on offer are original (such as SDS claims); most being copies of original work being done by others (including SDS). Smart Card piracy has become an almost accepted 'way of business life' throughout Europe and the pages of German published **Telesatellit** are filled with four-colour pages of advertising for both non-sanctioned (i.e., piracy) Smart Cards and major brand new equipment advertising from firms such as Philips, Seemann, and Nokia. BSkyB has in the past dealt with Smart Card pirated 'copies' by routinely replacing all of its legitimate customer cards with 'new issue,' modified encryption cards once or twice each year. As the BSkyB universe has grown (they added 900,000 new legitimate subscribers in the last six months of 1993) the logistics associated with completely replacing every customer's card has become burdensome. And in the best case, it bought BSkyB only two-three months of piracy-free operation since the piracy people would eventually crack the new cards and begin issuing their own replacements. Then SDS and others had their own technology break through that allowed them to, as the Irish High Court found, write their own algorithm instructions into their own cards and quite independent from the BSkyB cards, accomplish the unauthorised decoding. Now SDS and other 'quality piracy card suppliers' provide their customers with an optional extra; for NZ$75 per year, they guarantee to rewrite your card to a new scrambling algorithm should BSkyB actually make changes in the system which shuts down the (non BSkyB) card you own. All of this portends significant reductions in BSkyB profits for not only the balance of the current fiscal year, but most likely for several years to come.

China has beefed up prohibition against purchase and installation of private satellite TV dishes (**CTD:** 9311; p.20; 9312; p.20). To sell, install systems in future, firms must have capitalisation of NZ$210,000 and no fewer than 3 full time employees. Previous prohibitions announced in October limit TV dish systems to reception from Chinese satellites and Chinese programming, and then only in areas where terrestrial TV transmitters do not reach. Concern about 'western culture providing poor role models' for Chinese youths was cited as major cause of dish banning. An existing home-dish universe estimated to be as large as 4,000,000 preceded the new rules.

MTV may have international competition by early in 1995. Sony, EMI Music, Polygram and Time Warner are planning service which will launch in Europe, Asia first, eventually move back into USA.

EBU/European Broadcasting Union expects digital TV services to be in operation for satellite delivered to home broadcasting during 1995. Standards, using world-wide MPEG-2, are in process of being accepted by European Telecommunications Standard Institute.

DIGITAL TV

NEC has finished design and prototyping on magneto-optical disc system that draws on MPEG digital video format to allow direct recording on 5" (CD) discs. NEC says that by making better use of the available disc space, employing a new format of laser along with new disc material and improved MPEG processing, they have been able to place full 120 minutes of video on 5" disc. NEC believes the new technology will be first seen in camcorders and computer memory systems (1996) and in the case of camcorders, 5" (and smaller) discs would replace present tape formats. By designing camcorders that record directly on discs users would be able to place discs into PCs for direct view, editing, and production of digital information. Korean firm Samsung had previously announced a D-VDR (digital video disc recording) system which it hopes to have in the market by 1995 (**CTD**: 9312, p. 27). Several manufacturers are suggesting early-entry digital VCRs could become short-term products if D-VDR comes along rapidly. Physical properties of discs versus tape, lower costs of discs, storage and shelf space advantages of discs

would seem to suggest even new 1/4" digital tape formats may be vulnerable to eventual transition to disc as total replacement for tape.

American cable TV systems and sellers of TV sets in US plan to have last details of new compatibility standards between cable services and TV sets/VCRs/FM tuners worked out by July. Acting under federal mandate, consumer electronics industry and cable must reach agreement to insure that any 'cable ready TV set' sold after 1996 will have appropriate standardised jacks/plugs to allow direct wire interfacing. New IS-105 interface standard will eliminate mandatory use of cable company converters in future, although customers may still opt for same if there are features in the set top boxes which they prefer to those that will be built into all new 'cable ready' TV sets. The IS-105 standards were proposed and worked out prior to the explosion in digital technology and will not directly deal with the digital to analogue 'translation' which many cable channels will require by 1996. Under the new mandate, cable companies will be prevented from 'scrambling' their basic channel services. The new standard identifies 158 cable-specific 'channels', a throw back to the analogue umbrella in effect when the standards were first initiated. Once the IS-105 interim standards are solidified in July, they will be presented to the American National Standards Institute (ANSI) for a March/April 1995 'vote' of the membership. Complications presented by conversion to digital format transmissions have not been overlooked; there is a reluctance to specify standards for digital interfacing when digital is so new to the TV transmission world since premature specifications could 'freeze' development of digital before it is a mature technology.

Consumer electronic designers are being warned their 'complacency' towards the new world order of digital standards could force them to 'the shoulder of the new information superhighway.' Computer industry leaders believe 'Instead of the VCR or CD in your house being a standalone device, it's going to be a peripheral to the set-top in your house, just as the TV will become a peripheral to the set-top box.' Consumer electronic people are being urged to take an 'active, aggressive role' in debating the 'revolutionary foundations now being put in place for the digital, interactive world of the 21st century.'

February 24th was to have been 'decision day' for last element in HDTV transmission standards in US. The only missing element is the modulation format for over-the-air broadcasting. Two different modulation schemes are in final running: Zenith with '8-VSB' (vestigial sideband) format, General Instruments (GI) with '32-QAM' format. Winner will become US, possibly world, standard for terrestrial transmitters. Cable, satellite have less need for definitive standards since cable set-top converter ('translator') boxes, satellite receivers position in between incoming signals and viewer's receiver and each is capable of adjusting to modulation scheme used by programme provider.

General Instrument now has an order backlog totalling more than NZ$900m for 2.5 million DigiCable digital home (cable) TV set top 'converter' boxes. Latest to order was Cox Cable for 200,000 units at NZ$360 each.

CONSUMER ELECTRONICS

Home digital VCRs will apparently be available to first markets by this coming January; nearly 15 months ahead of earlier predictions. Panasonic executives in London revealed "*The Consumer DVC* (digital video conference 'standard') *will be deliverable in January 1995*" but declined to give additional technical details. In October ten major manufacturers of VCRs (eight Japanese, two European including Philips and Thomson) announced formation of Digital Video Conference to set standards on new world-wide MPEG-2 format based home digital VCR. Subsequent agreements concerning standardising digital format TV tuners have followed. Most recently, two computer manufacturers (IBM and Apple) requested permission to join the 'conference' because of their need to have a computer format record-on-tape system that will play on the new digital VCR format units. Panasonic revealed step-up time table for home units during news conference called to demonstrate and explain new broadcaster digital VCR (called the D5 format system). The D5 unit shown will sell for around NZ$108,000 initially while home style units are expected to sell for 1/100th that price. Both systems will use same 1/4" evaporated metal base tape with two cassette sizes: tiny 30 minute tape almost identical in size to DAT audio tapes, and larger 4.5 hour tape. In both D5 and home systems, switching recorder/player to double speed will allow HDTV to be recorded with a 50% reduction in total tape running time. Panasonic is suggesting that the quality of the home style DVC unit will surpass present day quality of professional M2 or Betacam format at 'pricing so low news people will be able to treat camera systems as completely expendable (throwaway).'

Electronic games 'violence ratings', built around motion picture rating system example, has software creators and distributors searching for proper forum to create rating system. Software Publishers Association, Council of Better

Business Bureaus, Motion Picture Association of America (MPAA) have put their collective abilities together to first define purpose for ratings, then to search for some method of assigning ratings.

1993 was largest retail sales year in history of US marketing for sale of virtually every category of consumer electronics. Leading the growth were colour TV receivers which reached record sales of 25.3 million for year. Extensive consumer surveys suggest that 1994 will be even bigger and trade associations are forecasting 4% increase (another 1m TV sets) in current year. According to American Electronic Industries Association (EIA), 98% of US homes have television, 79% have VCRs and: CD players 43%, videogame software 42%, home computers 37%, camcorders 21% and home satellite systems 4%. Personal computers is major growth area; 50% growth to 9.4 million unit sales this year is forecast with 36% of total likely to go into private homes. Please see detailed report at front of this issue of **CTD**.

Laser disc video, arguably the highest quality video distribution format currently available to consumer and industrial users, is likely to adopt Dolby Labs AC-3-encoded 5 channel audio this year. AC-3 coding is recommended audio processing system for MPEG-2 digital standard. With five channels of audio encoded using a 384 Kbps data stream, viewers would have essentially the same audio for 'home theatres' as movie goers now have in cinemas. AC-3 chipsets recently became available from Zoran Corporation greatly simplifying design and manufacture of 5 channel surround sound systems. The Laser Disc Association predicts outboard processors for AC-3 will be available early in 1995 but will be 'pricey' at first; NZ$3500 up per audio system. They also believe that within two years, such processing will become a standard feature of virtually all laser disc player products.

Transportable shopping mall oriented projection TV theatre is new packaged product from Sharp. A typical theatre TV format seats 15 people, can be converted from packing cases to operation in under two hours time by 2 people, with price of NZ$7200. Model XV-35U 3 LCD projector has 400 line resolution, 800 lux brightness with 40"/1016mm screen, functional 4:3, 16:9 and 21:9 screen modes.

Picture tubes are in world-short supply and that shortage is expected to become progressively worse during 1994 and 1995. CRTs, especially in sizes 20" (508mm) and up, are essentially pre-sold-out for all of this year and existing glass tube makers are showing reluctance to commit to major needed tube plant expansions in face of onrush of new projection TV and other big screen technology (including new TFT LCD displays) that threaten to put big screen CRTs out of business. US and European consumers have shown rapid swing towards preferring 27"/685mm and up screen sizes during past 18 months. TV picture tubes are now increasingly shipped by the boatload from Europe, Asia to Mexico and US to make up for shortages in North America.

Picture tubes would become yesterday's technology with Motorola development. What follows is not science fiction. Motorola has developed a miniature laser scanning system which is fitted into the temple frames of nearly standard size eyeglasses. The laser beam uses a configuration of tiny micromachined mirrors to 'paint' the electronic 'image' directly onto the wearer's eyeballs. There is no screen; the collimated light beam modulated with video information scans directly to the pupil of the eye. Electronics to support the system fits into a shirt pocket and power consumption is said to be 'very low.' Astute readers may wonder how a laser can propagate beams of light onto the retina of the eye without harming the eye. Motorola, in its recent patent application, does not address that question and requests for more information from the firm have been denied. Virtual reality headwear, just now entering the marketplace, requires significant hardware in the form of cumbersome goggles. Motorola suggests their new technology will replace all of this, and open up visual communications without the special hardware. One special feature: 3D displays, programmed for each 'eyeball', become very 'doable.'

Shortage of consumer electronic products, paced by cited shortage of picture tubes, is hardly limited to colour TV receivers. VCRs, especially those from Panasonic/National, are also in very short supply and retailers handling Panasonic or National brand units in 1994 may find shortages do not go away as manufacturers begin major adjustments preparatory to bringing out digital based VCR products. Similar product shortages are evident in camcorders and for similar (arrival of digital) reasoning they too may continue in short supply during 1994. If Panasonic (and others) really do plan early 1995 availability of digital format VCRs, with models for home and industry as well as in camcorders, end of 1994 inventories of analogue format units could be especially tight. Nobody expects manufacturers such as Panasonic to simply stop making analogue units; but analogue (only) units will make up less and less of the total product 'mix' once the digital units are in the retail world. Three major VCR manufacturers, all part of the DVC group, have begun price cutting on analogue equipment even in the face of product shortages. Thomson has cut typically 10% out of dealer pricing of four best-selling 25/27" colour TV models; Mitsubishi has done the same on a leading 26".

Adverts elimination from home videotaped programming has seen many attempts in last decade; none quite as sophisticated as Arthur D. Little Enterprises 'Commercial Brake' shown at Las Vegas Winter Consumer Electronics Show. Add-on box retrofits to home VCR with consumer price of NZ$360. When programming is originally taped, circuits check video/audio content and pick out inevitable production 'signatures' which signal transition from programming to commercials and back to programming. These 'transitions' flagged are time stamped and the times stored in memory. When viewer plays back tape the time stamping at start of each commercial break (brake) activates fast forward on player, places blue colour on screen as tape winds through and past commercials. At end of commercial period memory time stamp causes tape to return to normal speed and screen to return to taped material. Although firm will market 'Brake' unit as accessory in April, it is also discussing licensing technology directly to several manufacturers of VCRs.

Voice Wand is most recent consumer TV product from Voice Powered Technology. Firm is negotiating with TV and VCR manufacturers to incorporate system allowing users to merely speak into remote (hand held) unit to request specific TV services. In TV channel world growing towards 500 channel availability, device will switch TV or VCR tuner automatically to programme service requested on voice command by matching "*CNN*" (or any other service) statement to internally memorised channel universe. Company says viewers need only remember name of channel to use gadget. And if they forget? Second option is to call out type of service, i.e., "*News*" and Voice Wand will instantly switch to called for service.

Sony began selling new combo VHS + Hi8(mm) decks in Japan February 10. There are two models, both with stereo sound, priced in NZ$2200 - 2700 range. To satisfy worries of copyright holders, Sony has circuitry in units to prevent copying of pre-recorded (copyright protected) cassettes. Users, however, can dub non-protected tapes from format to format.

Six-head VCRs are on the way from Toshiba. Units typically employ 4-head technology for SP, 6-head for EP with newly developed signal pre-amplifier built into video head to improve video signal to noise ratio. Toshiba 'street' prices range in US from 2 head 'basic' model (NZ$360) to $900 for model with flying erase head. Toshiba has also signalled its intention to re-enter home satellite receiving terminal field (it was early entrant in 1984 but left when US industry took scrambling-induced nose dive) as well as bringing a 33"/838mm Pro-Logic TV into UK marketplace this month.

Sharp Viewcam VCR, selected as 'Best New (consumer electronic) product of 1994' by US Business Week publication, has gone into manufacturer rebate sales phase to hype off-season selling period. Discounts of 10% are possible in US when buyer mails in rebate certificate.

Sony has released Hi 8 version of Handycam 'Snap' camcorder-monitor package which it calls HandyCam Comics. Unit adds AFM stereo to Hi-8 processing, has 3"/76mm LCD active matrix monitor with Japanese street retail price some NZ$160 below competing low-end Sharp ViewCam; NZ$2125.

Hitachi is moving primary colour TV production from Taiwan to mainland China and expects 15% increase in non-Japanese built TV sets this year. Company will manufacture combo VCR/TVs in 13"/330mm size at Malaysian plant; previously sourced these from Korea's GoldStar and Matsushita.

Sharp, counting on its technology edge in LCD to drive company profits for balance of this decade, is building massive 600,000 square foot Japanese LCD production facility where it will assemble 10-17" LCD panels initially. Production of 150,000 units monthly is scheduled by end of 1996 fiscal year; plant will begin shipments July 1995. Displays will be advanced TFT design designed for wide angle, high resolution viewing. Sharp expects to have 43% of world-wide LCD market in fiscal year starting 01 April. Sharp is also upgrading existing Washington state plant to build up to 10,000 large format passive matrix colour displays plus 10,000 active matrix displays monthly. Initially, output will be for laptop computer and uses other than TV screens

Casio is now releasing new 3"/76mm LCD TV designed for AV monitoring applications as well as personal viewing. Using newly developed backlit low reflection TFT display designed for use in outdoor high ambient light areas, the ultra thin unit has thickness of just 32mm. Price in Japanese market is around NZ$750.

Two new CD-I models are planned by Philips for shipment in last half of this year, neither of which is directed at video CD area. A five-disc changer will allow electronic/physical access to multiple interactive game-oriented CDs while a second model is a console for game-oriented users. Philips continues reluctant to push entertainment programming via CD-I, principally because of lack of software in field. Initially, Paramount had agreed to release 50 films on CD-I but fewer than 20 have appeared to date. In January MGM/UA said they will release 30 films to 5" CD-I discs including many 'classics' (Rainman, Rocky, Thelma and Louise, many James Bond). Movie firms have been equally slow to rush into CD-I for several reasons: One, they are not convinced format will survive as digital

video CD matures rapidly over next three years; Two, there has been no 'copyguard' process available to prevent unauthorised copying of films from CD-I. Philips, in addressing last concern, promises 'copy protection' built into players, shortly, which may result in early players released being 'premium units' because they lack that copyguard circuitry. There are additional reasons for slow format start: Original movie releases from Paramount have been 'pressed' to original CD-I format, not industry agreed to 'White Book' standard. Philips hopes to have disc pressing format upgraded to 'White Book' by April. And, original Full Motion Video (FMV) cartridges available were designed to work with CD-I, not 'White Book' standard. Thus early buyers of cartridges are paying a compatibility price for purchasing too soon. Philips hopes to have newer FMV out by end of this month. Video CD-I with FMV has experienced rocky first 12 months since introduction, complicated by fine tuning of both hard and software. Japanese suppliers have held back entering field with their own products until the technical routines are sorted out.

Consumer video CD karaoke system is now being delivered by JVC in Japan. Package includes player + changer + processor with capacity of 100 discs; price is NZ$9,100 with speaker system extra. Karaoke discs are packaged in sets of 50, each with 16 tunes, at NZ$3700. With full package including speakers, user will pay full list in excess of NZ$15,000.

Sega 32-bit videogame system (Saturn) details have leaked. Game system is basically patterned after graphics work station for industry redesigned for consumer use. System uses 9 microprocessors operating at a claimed speed equivalent to a single chip at 800 MIPS. Of the nine, 3 are graphics co-processors while 2 are the Hitachi created 32-bit RISC units. Internally, there is 36 Mbs of RAM including a CD-ROM drive RAM and another doing only high speed audio processing. CD-ROM player with its own CPU will work at twice 'standard' speed to allow faster access timing. First units are likely to be available in Japan by September with pricing in NZ$800 range.

Sega and Microsoft are reported to be teaming up in project to create interactive TV platform which will be windows/icon driven. Sega plans to inaugurate US cable TV speciality channel this year built around existing and newly developed interactive games which it will also offer for sale to channel users through automated Sega-to -cable-home distribution chain with customer's home computer acting as interface for download. Microsoft has been working to establish a 'standard' for interactive TV platforms recognising that all of the many would-be cable distributed interactive service providers will improve their chances of success in the new marketplace if there is a defacto-standard for the access and control portions of the various offerings.

Amiga CD-32 multimedia console equipped with MPEG cartridge has the ability to play back a feature film encoded for CD-I player. Surprise announcement flies in face of assertions by Philips that discs encoded for CD-I cannot be used on a player built to Video CD White Book standard. Amiga CD-32 system has bypass circuitry which goes around CD-I 'header tracks' and directly to MPEG encoded information. Philips and British firm Nimbus (**CTD**: 9311, p.28) have sparred on this very issue with Nimbus claiming Philips created software for CD-I principally to rule out using existing audio CD players as video CD players. Audio CD players when detecting the presence of video information basically shut-down; Amiga is apparent exception.

3DO and Matsushita plan to introduce 3DO format 'REAL' game format units into Australia/New Zealand in PAL format package after May debut in UK. 50,000 players were sold in US in 3 month runup to Christmas; Japanese units backed by Japanese software will be introduced in mid-March. Masushita plans new game console with built-in display screen towards end of this year.

Radio Shack, world's largest chain electronics store operator, is opening first outlets (30) in Russia this year in partnership with Trident Group, a Florida based distributor.

CABLE/FIBRE OPTIC TELEVISION

Greymouth PacSat cable TV system progress has all but stopped according to residents in the South Island community. PacSat system missed first promised Christmas-service announced date, now appears to have missed community-wide February start date as well. System lost ability to utilise new Hokitika TV3 translator station (**CTD**: 9401, p. 34) in December, simultaneously was experiencing engineering difficulties with its satellite antenna system. During past four weeks, some small amount of new cable continued to be installed in preparation for eventual service start.

Merger between TCI (cable) and Bell Atlantic (telephone) moving ahead with no major obstacles 120 days after first announcement of mega-deal. Under US laws, telcos are prevented from operating cable TV in same geographic area as telephone networks so where TCI has cable established within BA regions, those cable systems will be removed from 'merger package' at least temporarily. If moves to strike the existing rules succeed, TCI's conflicting

cable systems would later be merged into new corporate entity. Size of merged companies remains in range of NZ$54B.

Glasgow, Kentucky (population 12,351) municipally owned cable TV system is installing equipment from First Pacific Networks (Sunnyvale, Ca.) that will convert existing cable system to a broadband data/telephone network. Town also operates its own power distribution grid but unlike power and cable TV, broadband network will pit it against established major telephone company. To compete with GTE, municipal system will offer three different levels of service at rates 33% lower than telco including local only phone (to reach subscribers only within community) at cost that is 1/3rd of present GTE rate. Here in New Zealand, PacSat has proposed similar system for Greymouth but system now being installed there lacks two-way capability.

US West telephone company, building 100,000 home 'test' system around fibre optic hardware has announced similar plans for building 'test systems' in Denver, Portland, Minneapolis-St. Paul and Boise (Idaho). They plan to turn on Omaha to initial 2,500 homes by May, 60,000 homes by September.

Southern New England video dial tone (one channel video into the home, on demand, through hybrid fibre optic and copper twisted pair technology; **CTD** 9309, p.2) 'test' is drawing extensive regulatory flack from Connecticut cable TV operators. Under FCC rules, tests of new technology are allowed even when they violate existing regulations. And regulations in force prohibit telephone companies from offering cable-TV-like services in regions where they also operate the telephone service. Approvals for 'tests' usually involve relatively small regions of a few hundred to a few thousand homes. The Connecticut 'test' would reach 10% of the population of the state at an estimated cost of NZ$8.1B. Cable operators believe this is no 'test' but a full-scale commercial rollout of a prohibited service.

British cable's growth in telephone customer installations continues at furious pace. In mid October, home number 250,000 was connected and at end of December number had grown to 314,381; a quite spectacular growth of 907 per day (!). From December 1992 to December 1993, number of British cable TV systems offering telephony also grew rapidly; from 24 to 43.

British Telecom (BT) has announced rate cuts averaging upwards of 3% for residential and business customers. Company had been mandated to cut rates no later than July, did so earlier than it had to in face of recent intense competition from Mercury and Britain's rapidly growing cable TV system operators who will by end of this year offer almost universally telephone service in addition to cable TV offerings (**CTD**: 9312, p. 28). BT spokesman appearing on BBC admitted firm has not been as quick to respond to competition as it might have been; promises more 'customer oriented pricing and services' by end of this year.

British cable industry survey suggests even greater escalation of industry expansion over coming 2 years. Study reports industry plans to spend NZ$3.6B on network expansion with parallel growth in number of people employed in British cable plant systems by 254%.

TCI (cable) has purchased 62% share of British television programming firm Flextech. TCI already held share in numerous UK satellite/cable programming services including UK Living (31.3%), UK Gold/Children's Channel and Bravo (25% each).

Top-level telephone executives from AT&T are warning manufacturers, distributors and retailers of consumer electronics that cable may put them 'out of business.' Calling cable operators 'Gatekeepers for their own benefit,' exec cited scenario where as cable set top converter/translator becomes more formidable in design and capabilities, there will be fewer and fewer functions for traditional TV receivers to perform. In worst case scenario, he suggested that within ten years traditional retail electronic sellers will be reduced to selling 'picture tubes and speakers' while cable operators provide set-top boxes that perform every other TV receiver function.

Information Superhighway concept in US slowly coming into clearer focus as Clinton administration begins long road to secure approval from Congress. Amongst definitions contained in plan is 'Universal Service' phrase, defined as "*every American is entitled to have access to telephone service, and, free-to-air broadcast television.*" Both 'entitlements' will be spelled out in new legislation being prepared. From these two basic concepts various rights and privileges will flow to both the public at large and the firms who will provide service. One possible scenario will be a relaxation of (present) heavy handed government regulation for either service if the service providers will guarantee access to the 'networks' on a universal, non-discriminatory basis. This would primarily affect cable TV and telephone providers who, the suggestion goes, could elect to be regulated on a case by case basis as they presently are by simply refusing to adopt universal, non-discriminatory access provisions to be contained in the new act. Another segment of the proposed legislation treats the 'bandwidth' in an information superhighway much as the present (1934) Communications Act treats the frequency spectrum. Companies who choose to be 'universal information

providers' and who wish the benefits of the new legislation will be required to assign portions of their overall bandwidth for specific purposes, such as education and health care. Pressure groups are 'demanding' bandwidth plus universal access to non-profit institutions including hospitals, schools, libraries, local and state government institutions. An additional portion will insure that network providers are not 'information gatekeepers' who use their position of system provider to limit access to their networks to other, potentially competitive companies. Cable TV group owners such as TCI have been accused of using their ownership in various programming services (such as HBO, Showtime, CNN et al) to determine which 'service providers' will have access to their networks. The act will attempt to create 'non-discriminatorial access' to the new superhighways by withholding legislated privileges from firms who continue such practices.

Programmers such as US networks have not been invited to participate to date in discussions for the Information Superhighway and are not happy being left out. US broadcasters are limited by 1934 law to one programme at a time in any market area (i.e., Hamilton, Auckland would be two markets). However, like TVNZ, broadcasters realise they will shortly have (digital) 'bandwidth' to spare, and the technical capacity to transmit two, four, six or even eight simultaneous programmes. They want the 1934 law changed to allow this, but to date their plea has evoked little sympathy from the regulating agency (FCC) or Congress. American ABC network, not itself limited from creating more than one TV programme at a time (only the broadcasters are limited to terrestrial transmissions of one programme each), has begun using phrase 'multiplexing' to describe its plans to distribute not only mass appeal network fare but also topic-specific programming such as full-time news. Rupert Murdoch, participating in an industry panel discussion on subject, said, "*Broadcasters should have a fair chance to play greater role in interactive information*" and suggested that while FCC may assign NTSC-like 6 MHz 'bandwidths' to next generation terrestrial telecasters, "*Each station owner should have the legal right to use his spectrum any way he sees fit.*" Murdoch noted that a broadcaster might wish to occupy the entire bandwidth with an HDTV signal, or, "*up to six compressed digital video simultaneous, separate programmes.*" CBS VP of technology Joseph Flaherty warns, "*People agonise over the cost of digital, but without digital there is darkness at the end of the tunnel. Terrestrial TV will disappear without the transition to digital*" (a reference to the adoption of digital by satellite and cable programmers). New Zealand apparently plans just this; to allow TV network operators (TVNZ, TV3) to make decision how they will utilise their bandwidths (**CTD**: 9401, p.2).

Ameritech, US regional telephone operator with stake interest in Telecom and Sky TV here, will spend NZ$7.9B to convert 50% of its 12,000,000 telephone subscriber home plant to fibre optic/coaxial cable hybrid technology by 2000. Plant design calls for fibre to 500 home 'nodes' and coaxial cable branching out from each node to individual subscribers; essentially same technology employed by Ameritech investment plant in suburban Auckland. Designers claim system will have bandwidth for 1,000 video channels, a number that is quite meaningless in terms of true capacity given constant state of improvement in compressed digital video technology. The first customers to enjoy the new technology should be on line by the end of this year; system will add approximately 1,000,000 new homes/businesses each year through 2000. Ameritech's telephone plants are centred in and about the Chicago area.

Bell Atlantic, also investor in Telecom New Zealand and Sky TV, has chosen Philips Digital Videocommunications Systems, plus, Compression Labs, Inc. to create new Digital Entertainment Terminals (DET). The new interactive intelligent terminals will be in-home units for video-on-demand Bell Atlantic will launch late this year in state of Virginia. The MPEG-2 CDV standard will be followed along with Musicam (Dolby) audio system.

Quebec's two-way cable TV pioneer Videoway has attracted NZ$360m investment and created consortium of 7 firms (including itself) to rebuild existing 500,000 subscriber-plus cable TV services in Montreal and Quebec City region into interactive multimedia operation. A 34,000 home region serving Saguenay, Quebec is now being retrofitted with the new technology that is built around a Videoway designed set-top converger with CEBus interface for home automation. With alphanumeric remote control 'transactional module', the set-top unit uses 'smart card' technology to allow system users to interface and instantly pay for services or products selected. A small printer is built into the set-top unit providing a hard copy record for the consumer. The range of services to be available have not been detailed yet but the make-up of the consortium of 7 companies gives a clue. They include Hydro-Quebec (automatic bi-directional control of individual home energy loads), National Bank of Quebec (financial services, banking transactions), Canada Post Corporation (E-mail), Loto-Quebec (lottery), Hearst Corporation (business information, directories plus electronic shopping). The consortium is collectively known as Le Groupe Videotron.

South Korea is latest country to officially sanction cable television. Government has granted franchises to 50 community operators, plans to grant 66 additional approvals shortly. There are regulations that limit foreign ownership to 15% of non-news format programming services.

TERRESTRIAL BROADCASTING

Regional Television Trust Chairman John Howard (**CTD**: 9401, p.3) has received an answer from his formal complaint filed with the Commerce Commission concerning Howard's allegations that BCL had overpriced to his group transmission site and equipment quotations. Howard has been the spark plug behind attempt to place on air regional, non-profit 'public' television service serving Waikato to Coromandel. He alleged that BCL quoted him transmission site rates and transmission equipment costs which he believed were designed to favour existing BCL customers and impede the establishment of a new TV service. BCL is 100% owned by TVNZ and supplies transmission site and equipment services to its parent as well as TV3, Sky and other broadcasters. In a letter dated 13 December (answering a formal complaint filed by Howard in January 1993) David Taylor (Chief Investigator, Network Industries Unit, Commerce Act Division) advised Howard "*...the whole issue of access to telecommunication sites was comprehensively investigated by the Ministry of Commerce who found no evidence that BCL was discriminating against non TVNZ broadcasters as regards access to its transmission sites.*" Actually, this is not exactly what the Ministry decided as **CTD** learned when we requested copies of the cited MOC 'investigation reports' under the Official Information Act. There are three relevant documents at the Ministry, dated 26 June 1991, 30 September 1991 and 21 December 1992. The last (now some 14 months old) notes in part: "*None of the major site-proprietors is prepared to acknowledge that any aspect of their current behaviour could reasonably be described as anti-competitive in behaviour ...Short of a formal enquiry or legal action, we suggest a more crude measure of anti-competitiveness* (might be) *the extent to which site-users have complained* (to the Ministry) *of the behaviour of site-proprietors ... This is not to say that complaints about the cost of access to transmission sites have ceased.*" Commerce's David Taylor did not voluntarily provide complainant Howard with a copy of any of the Ministry of Commerce documents **CTD** obtained under the Official Information Act. For those who feel they have been the victim of unfair competitive practices relating to sites and equipment leasing, the Ministry of Commerce has recommended the entire subject be revisited mid-year, this year, providing those with grievances an opportunity to file comments in a (new) formal enquiry.

Ministry of Commerce spokesperson addressing charges in CTD (9401:p.2) that VHF/UHF broadband 'flea-power booster station' licensing regime is unrealistic now suggests "*The Ministry would assess the value of the licence under consideration and follow the relevant policies. Clearly as different technologies are involved there would need to be some judgements made.*" That's bureaucratic doublespeak for 'Yes, we agree the $3,500 booster station license fee may have been out-of-line and we'll discuss lower fees with the applicant for the license.' At issue is that the Ministry makes no formal recognition of the need for very limited range on-channel boosters as a method of filling in coverage behind hills and prefers to treat each such applicant with a system that demands licensing fees that begin at $500 and go upwards rather than adopting a more realistic national policy in this area. As long as potential licences are forced to start with existing rules, almost no such applicants come forward. Stay tuned.

Hokitika TV3 extension translator made operational in December may be upgraded and west coast South Island service extended north to Greymouth. TV3 initially showed little interest in making it possible for would-be Greymouth cable operator PacSat to use Hokitika TV3 signal (**CTD**: 9401, p.34) but may have alternate plan now. By spending funds to upgrade Hokitika channel 11 unit, increasing power to 50 watts, a second TV3 translator could be installed to serve Greymouth on channel 8. The new channel 8 unit would be fed by Hokitika channel 11, and make TV3 available to most viewers in Greymouth. In this way PacSat's cable TV advantage of carrying TV3 would be eliminated if the Greymouth homes could pick up TV3 from a local channel 8 unit. It is a win-win for TV3 if they can pull it off; PacSat gains local source for TV3, but loses ability to use its carriage of TV3 as a cable selling point. By making TV3 generally available to Greymouth homes via new channel 8 unit, TV3 removes one primary reason for PacSat to exist at all in Greymouth. This suggests to some a new strategy to get TV3 to put in service for communities presently without: Simply threaten to build a cable system to bring in TV3, and watch how fast TV3 finds a way and the budget to get their service into your community!

RFS29, the November-promised revision document which was intended to unscramble the confusion created by the unlicensed, low power (300 milliwatt) FM 'broadcasters' operating in the 100-101 MHz region was scheduled to go to 'typesetting' at the Ministry of Commerce on 04 February. **CTD** reported on the rapid growth of 'tourism related' totally legal, but low power, FM radio services operating in Taupo, Auckland and other areas in our November (9311; p.33) and December (9312; p.36) issues. Unfortunately, perhaps, for promoters of this service all of this recent activity attracted the attention of Radio Operations Group employees who were at first confused when their routine frequency monitoring revealed commercial sounding 'FM stations' operating above the top end of the standard FM broadcast band (which runs 89-100 MHz). Ministry rules allowed such operations, but 300mW limits

were intended for 'wireless microphones' rather than the sounds-like-a-commercial radio station operating-without-a -formal-license facility. Typical coverage ranges to 3km plus had proven quite ideal for tourist areas attempting to provide transients with tour and event information through automated self-repeating 2 to 4 minute recorded messages. And, in fact, an almost identical type of unlicensed radio service is authorised in Australia (with ten watts power), the US (with 1 watt power) and elsewhere. The Ministry decided to label these operations 'talking billboards' since their self-repeating message format seemed more like an announcement than an attempt at being a fully staffed radio station. Transmitters in Auckland are programmed with English, German and Japanese tourist messages, others with descriptions of cinema films and start times. The appearance of this 'significant variation from the original wireless microphone intent of the 100-101 megahertz service' was reason enough to send Ministry policy makers back to the computer screen to refashion rules. What remains unknown as we go to press is whether the newly revised RFS 29 statement, when issued, will condone and sanction 'talking billboards', or condemn them to oblivion as a clever idea that was zapped by bureaucracy before it had an opportunity to prove its worth. MOC's Bruce Ivamy suggests the revised RFS 29 should be available for distribution around February 28-March 04. If this item is of interest, you can request an 'urgent copy' by telephoning 04-472-0030 and speaking to Mr. Ivamy.

Jay Mather, electronic innovator who created one of the few MOC approved 300mW transmitters for the 'talking billboard service', has taken his technology several steps further since November. Mather now has reconfigured his transmitters such that their solid state (non-tape) self-repeating message loop will not lose content when the power is shut down. Previously, a standby 9 volt battery was required in the unit to ensure the pre-recorded message stayed intact if the transmitter lost mains power. The newest model can be programmed in (say) Auckland with the message, shipped via slow courier to anyplace in the country, and come out of the box, turn on and immediately start up with the recorded message. The unit also has the ability to be reprogrammed with a new message by simply flipping a switch and speaking into a plug-in microphone. None of this impacts on Mather's MOC approval that allowed the unit to be sold without the user required to obtain a Ministry license. A **CTD** reader contacting Mather sent him into another project and the result is a basic 5 watt stereo FM transmitter followed with a 100 watt solid state amplifier. FM transmitters are built in New Zealand but most are imported from Italy and other overseas manufacturing points. The unusual part about Mather's basic 5 watt unit is the price; under $2,000. And the 100 watt version? Less than twice the cost of the 5 watt. That compares rather favourably with 100 watt units imported in the $9,000 and up range. Mather's address and telephone number? Vexx Digital FM Ltd., 10 Relko Cres., Torbay, Auckland; 09-473-1818.

Kaitaia College is the latest (and the third known to **CTD**) school to take advantage of little known Ministry of Commerce rules allowing non-profit low power (0.5 watt e.i.r.p.) telecasting in the UHF channel range (either channel 41 or 42). Rules allow schools and others who will operate such stations without any intent of making a profit to obtain annual (12 month, renewable) apparatus license. Kaitaia College is installing transmitter obtained from Signal Master (Auckland: 09-525-5599) which will be used to broadcast college created and other instructional television over large campus area from the new AV production facility into every classroom. Project co-ordinator,

"QUOTES", NOTES & ANECDOTES

"TABLOID TELEVISION NEWS *is clearly doing the work of the devil. We have been quietly abandoning the thoughtful audience to the detriment of our business and the trend is spreading like a virus.*" NBC News President Andrew Lack before Dupont-Columbia University journalism forum.

"IF BELL-ATLANTIC-TCI *merger is okayed, you've got two guys deciding what 50 million people are going to see ... that's kind of scary.*" NBC West Coast President Donald Ohlmeyer before TV Critics Forum, Los Angeles.

"I'M HAVING TROUBLE *getting my TV material distributed. Time Warner and TCI wouldn't give me the time* of *day because of their investments in CNN.*" Rupert Murdoch appearing at Information Superhighway Summit.

"TECHNOLOGY IS RACING AHEAD *so rapidly that the media mogul has been replaced by a bevy of harassed and sometimes confused media executives trying to guess at what the public wants. Convergence is seeing some of the world's largest industries trying to accept a new age in which few of the old rules seem to apply and traditional distinctions are breaking down. Five of the world's biggest industries ... computing, communications, consumer electronics, publishing and entertainment are converging into one dynamic whole.*" Rupert Murdoch at a media luncheon in London.

Peter Durney, sees multiple benefits from new service: students operating the system will be exposed to basic television programme production techniques, classrooms will be able to make use of growing national library of videotaped teaching aids without necessity of 'cabling' entire school (a project which Kaitaia estimated could not be budgeted for five or more years because of cost), and the system is almost instant start; from conception and budget approval (the 0.5 watt transmitter system is around $3,000) to MOC licensing and going on the air has been around 90 days.

SKY testing of Mt. Erin transmitter (channel 31 vertical) with standby 100 watt transmitter now in its third month. New 8,000 watt transmitter is scheduled for March installation but test results at distances of 70-100 kilometres with low power transmitter are proving instructive to installers in Hawkes Bay region. One installer in northern Hawkes Bay town has done extensive testing throughout his community, created 'map' of sites where fringe area SKY service will be of adequate quality in his town. He reports *"Approximately half the homes in town will get a great signal when 8 kW transmitter is operating, others will get good reception but require masthead signal preamplifiers. I did my signal checks before SKY had been here with their own test equipment and they shocked me* by *going around town telling people* 'not to expect service!' *Since my own extensive checking showed the opposite to be true, I tried to set up an appointment with their field people but they failed to keep it. I really don't think SKY has done their homework properly; if they persist in this attitude, SKY may just lose a few sales to satellite dishes ..."*

British Department of Trade and Industry has created spectrum allocation for digital audio broadcasting (DAB); 217.5 to 230 MHz. DAB digitises audio in CD format, transmits to digital format receivers with CD-like quality. With assignment of spectrum, British broadcasters will simulcast AM or FM transmissions in DAB for period of ten to fifteen years with eventual close down of present analogue Band III (FM) services. Simulcast transmissions should begin in 1995 allowing receiver manufacturers to build product for the service. Spectrum allocation is at this point unique to UK; adjacent Ireland, France, other European countries use this spectrum for TV broadcasting. Next step is BBC selection of DAB transmission standard. New Zealand Ministry of Commerce, acting in response to Official Information Act queries from CTD, insists they have no plans to specifically authorise 'DAB' here.

Violence in television has reached level of being major political issue in US. TV networks (ABC/CBS and NBC) are receiving most of the criticism for their perceived failure to 'control' amount of violence that appears in shows. Children's programming, especially cartoons, has been singled out for their 'violence' with more than a dozen proposed bills presented for Congressional study. ABC VP echoed sentiments of many broadcasters by noting *"I certainly don't think we've done anything to warrant the kind of government intervention that is being threatened."* Some of the proposed legislation would require TV set makers to build into TVs 'violence chip' which all TV programmers would then be required to 'address' with special signal imbedded inside of TV programming. Concept is that chip would alert TV set users that programme they are watching contains 'violence' with on screen display and allow parents or others to programme TV set so that it would not function on violent programmes without their approval. Networks oppose such 'programme branding' although many cable programmers have said they support V-chip plan. Those supporting V-chip plan draw parallel with other accepted areas of 'social responsibility,' including " ... *like owners of swimming pools where many jurisdictions require fencing around the pools, programmers and broadcasters are legally responsible for the effects of their actions when they can reasonably foresee that their shows cause children harm."*

TECHNICAL REPRINT SERVICE

TECHNICAL PAPERS created over the period 1956 to present, by CTD editor Robert B. Cooper, trace the development of television (terrestrial and satellite) from the early black and white 'days' to the modern GaAs-FET low noise amplifiers. Reprint/copies of selected reports are available from files. Use this form, or copy; include your name and address for prompt service!

ANTENNAS

LaPORTE and other Rhombics; 15 pages. Fully describes use of single, multiple (stacked) Rhombic antennas in VHF (UHF) range for terrestrial (horizon-angle) reception with directivity and gain combinations unmatched by any other antenna design.

☐ **LaPorte RHOMBIC Construction / $10.** (reprint 10/76)

HALF-BOLICS; 25 pages. Full description of theory and duplication of broad band (bands I,III,IV and V) beyond-horizon screen reflector plus feed system capable of quality reception to distances of 250km.

☐ **HALF-BOLICS Construction / $15.** (reprint 123/78)

SURFACE WAVE Logis; 9 pages. Oliver Swan 'invented' log-periodic antennas. At the time of his death he shared notes on a new 'surface wave' design of 18 dB gain yagi-log hybrids. Complete build-your-own details; 50-230 MHz

☐ **SURFACE WAVE LOGIS Construction/ $10.** (reprint 3/77)

G-LINE TRANSMISSION Systems; 7 pages. A single-wire transmission line with losses under 1 dB per 100m at 500 MHz. Lowest possible loss of any known transmission line; construction details.

☐ **G-LINE SYSTEMS/ $10.** (reprint 23/62)

MEASUREMENTS/MEASUREMENT SYSTEMS

EVERYMAN'S ECONOMY SPECTRUM ANALYZER: 12 pages. Take a varactor tuned $80 CATV converter, add some clever circuits and demodulate the output in a scope detector feeding into your low-cost scope. Result? A spectrum analyzer covering 40-300 MHz (+). Brilliant test equipment on a budget.

☐ **EVERYMAN'S ANALYZER/ $10.** (reprint 711/75)

MARKER GENERATOR/MARK-A-CHANNEL; 25 pages. Although USA channelized, adaptable to NZ TV channels. A pair of low-cost ways to construct your own scope-display (or FSM) channel-marker for alignment and test.

☐ **MARKING TV CHANNELS/ $15.** (reprint 578/74)

FIELD STRENGTH/SIGNAL LEVEL METERS, How They Work; 80 pages. Comprehensive overview of how VHF/UHF TV signal strengths are translated to meaningful 'numbers', with analysis of commercial products in field.

☐ **FIELD STRENGTH METERS/ $35.** (reprint 10112/74-156/75)

CABLE MATCHING / VSWR MEASUREMENTS; 5 pages. When 75 ohm cable is connected to a mismatched source or load, signal voltage is lost. Now you can measure match, and with the described 'matchbox' correct for mismatch.

☐ **CABLE MATCH / MATCHBOX/ $5.** (reprint 1175/3/76)

SELF-HELP CONSTRUCTION PROJECTS

SIMPLE TV PASS BAND FILTERS; 15 pages. An extensive review of how (single/multiple channel) bandpass filters for TV are designed plus a series of bench-build filters you can create. Isolate single channels, cleanly!

☐ **TV PASS BAND FILTERS; Construction/ $10.** (reprint 12/74-3/76)

THE GAIN BLOCK; 14 pages. Take either of two broadband chips (TRW 501; HP35600B) and with instructions create either of two broadband (20-300 MHz+) bench amps (16 to 30 dB gain) with 75 ohm input/output impedance.

☐ **THE GAIN BLOCK; Construction/ $15.** (reprint KIT-2/78)

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